Particle

MESH COMMUNICATION AND PARTICLE PRIMITIVES

GETTING STARTED WITH THE WEB IDE

MESH PUBLISH & SUBSCRIBE

WORKING WITH PARTICLE PRIMITIVES

MANAGING DEVICES FROM THE CONSOLE

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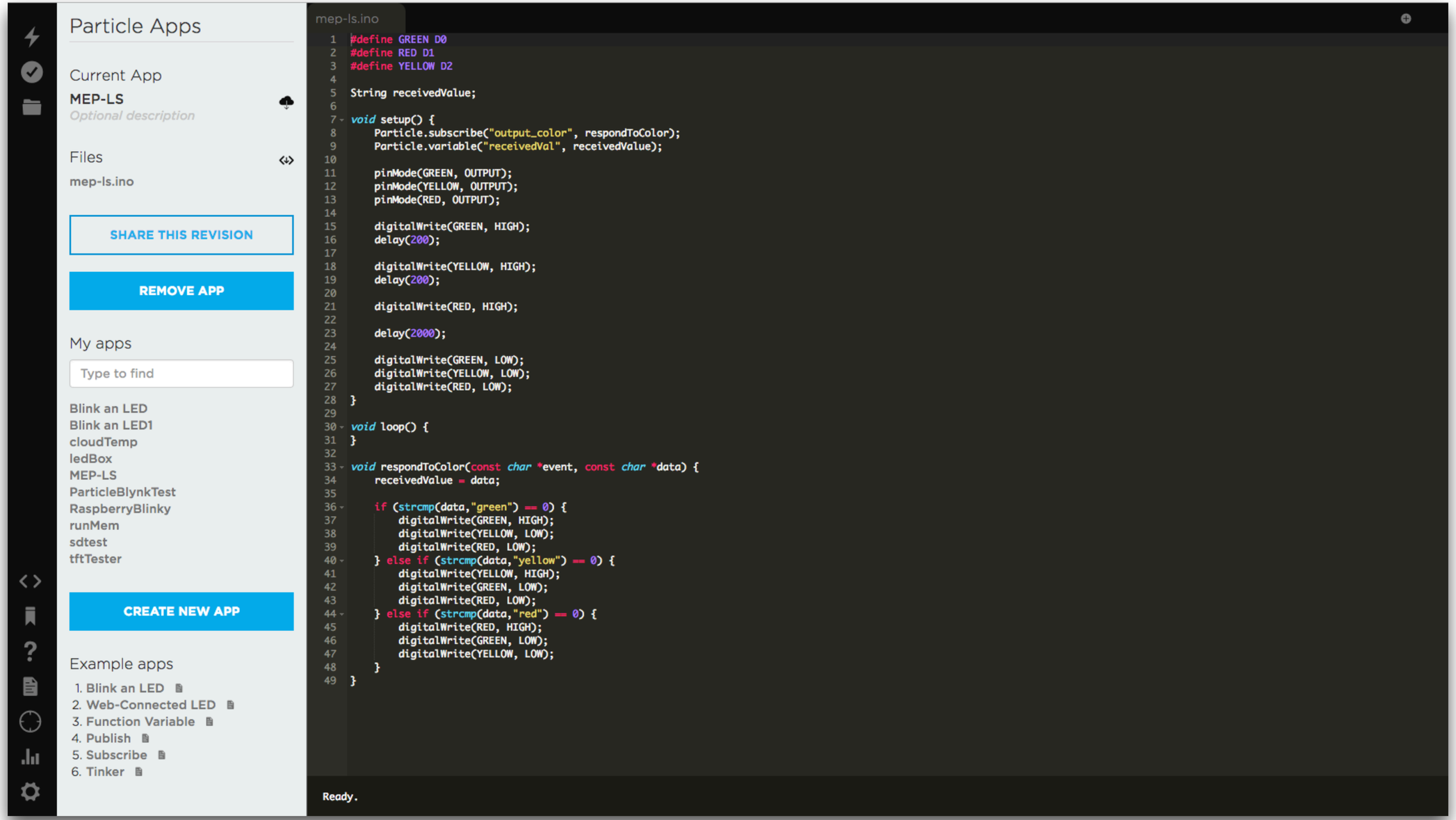
BUILD.PARTICLE.IO (WEB IDE)



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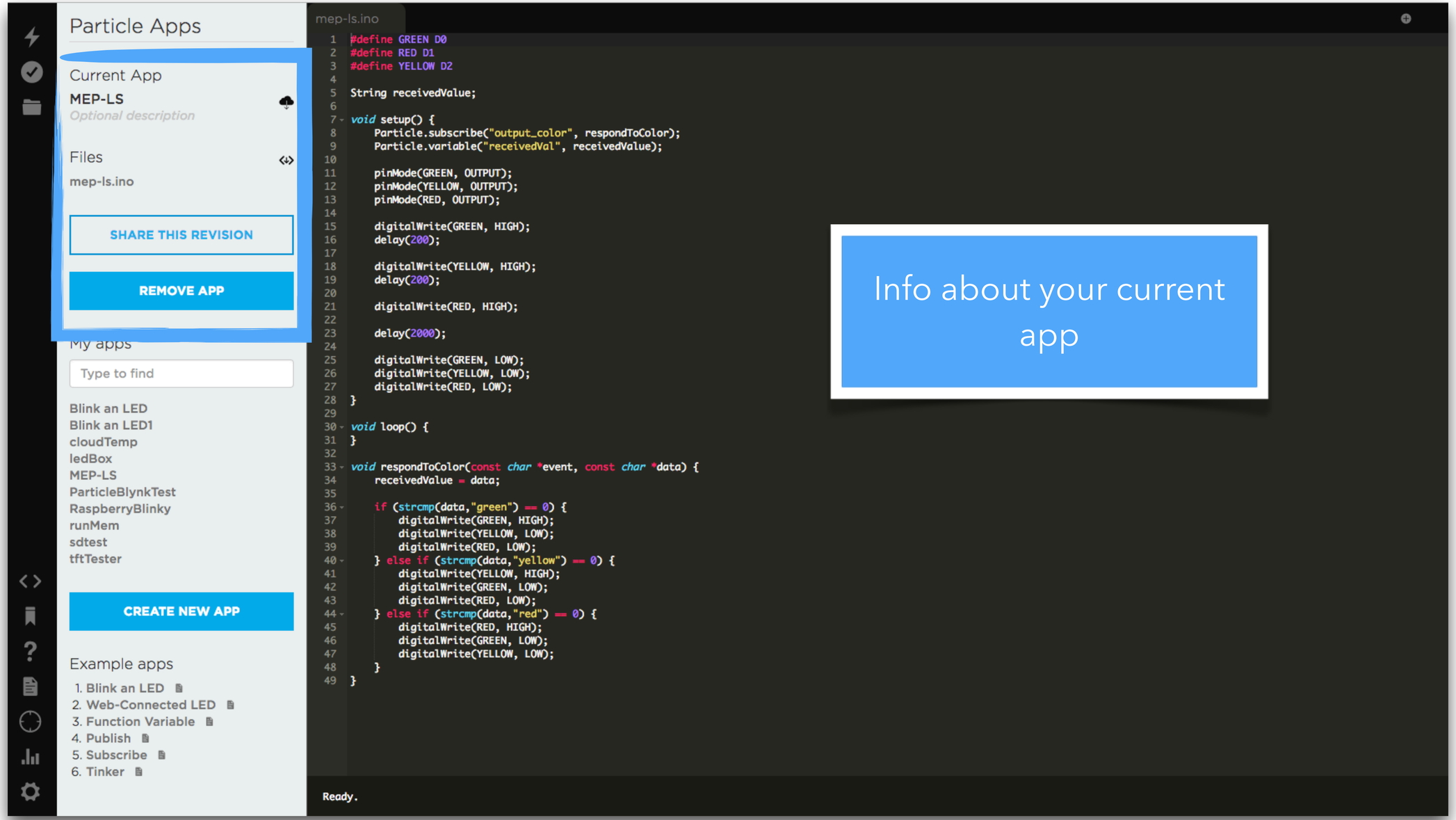

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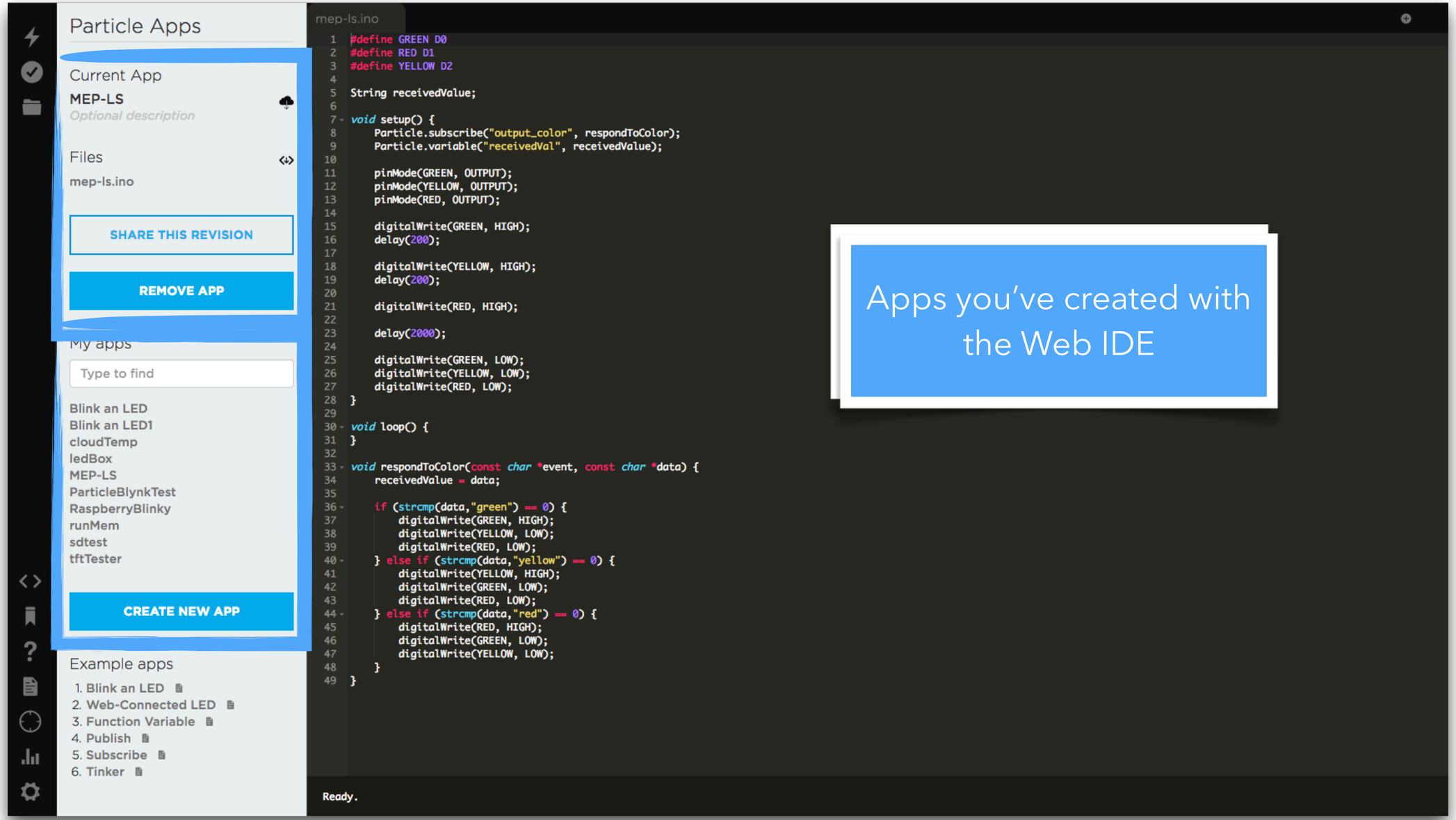
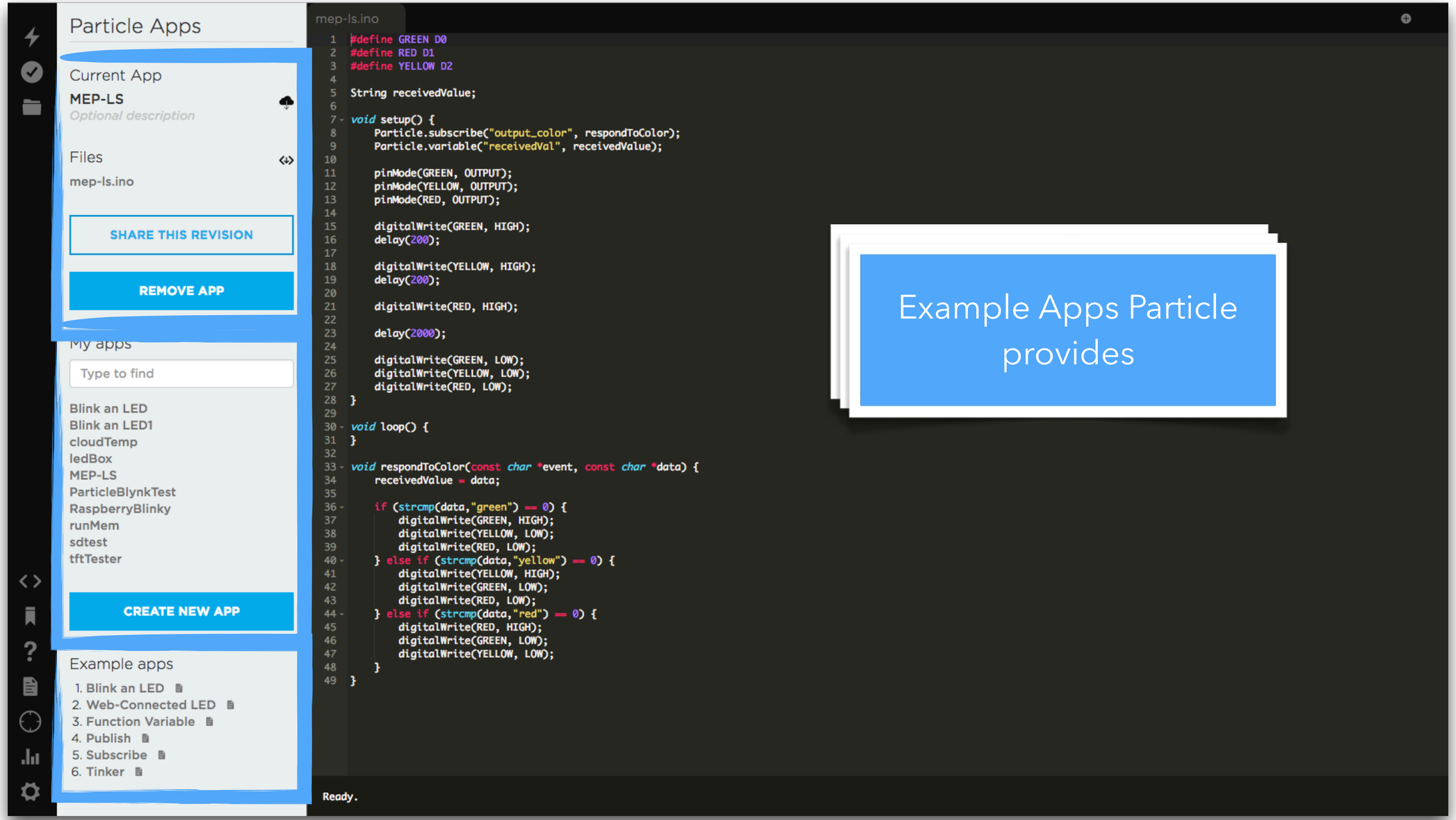


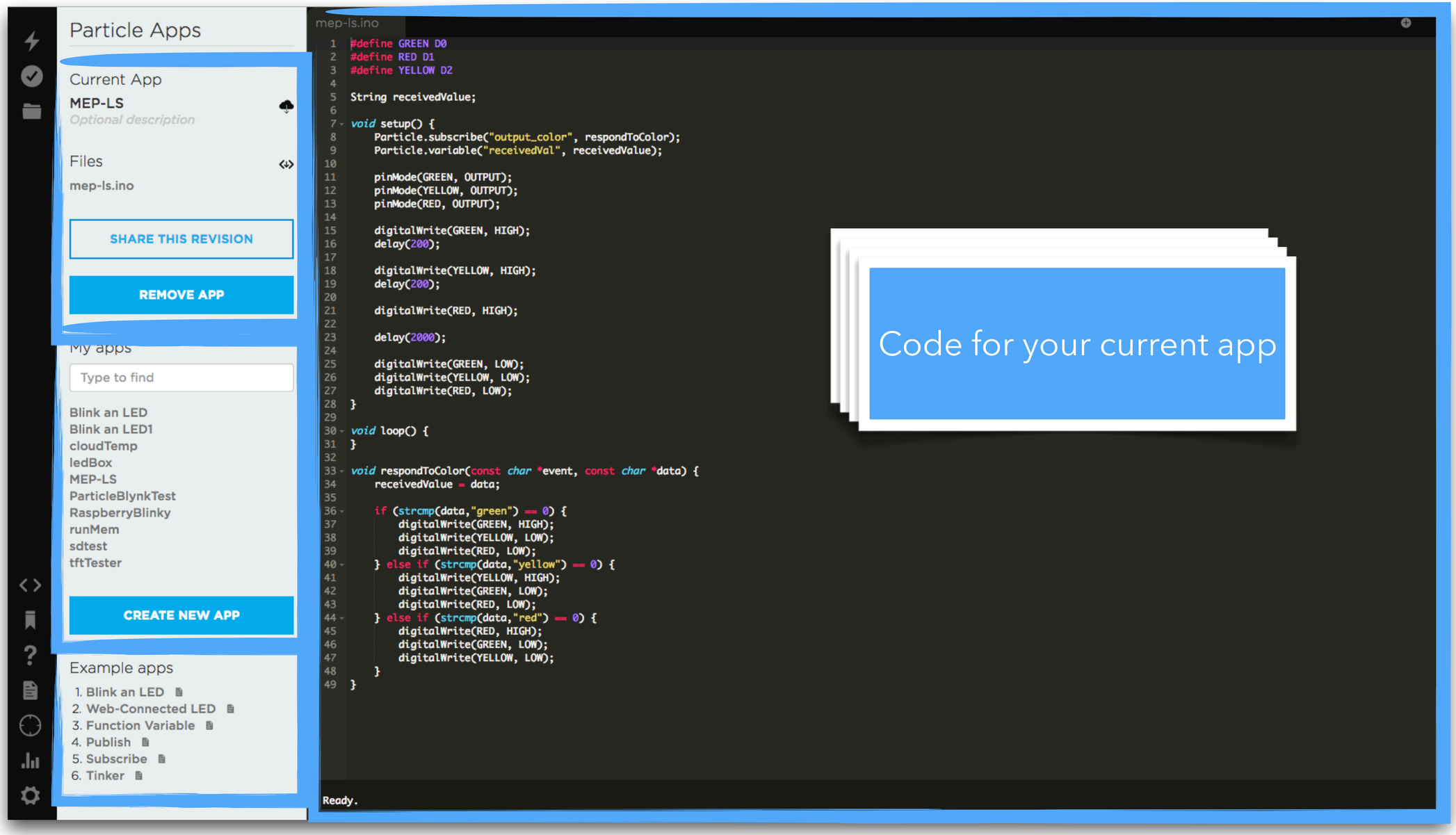
Apps you've created with the Web IDE

BUILD.PARTICLE.IO (WEB IDE)

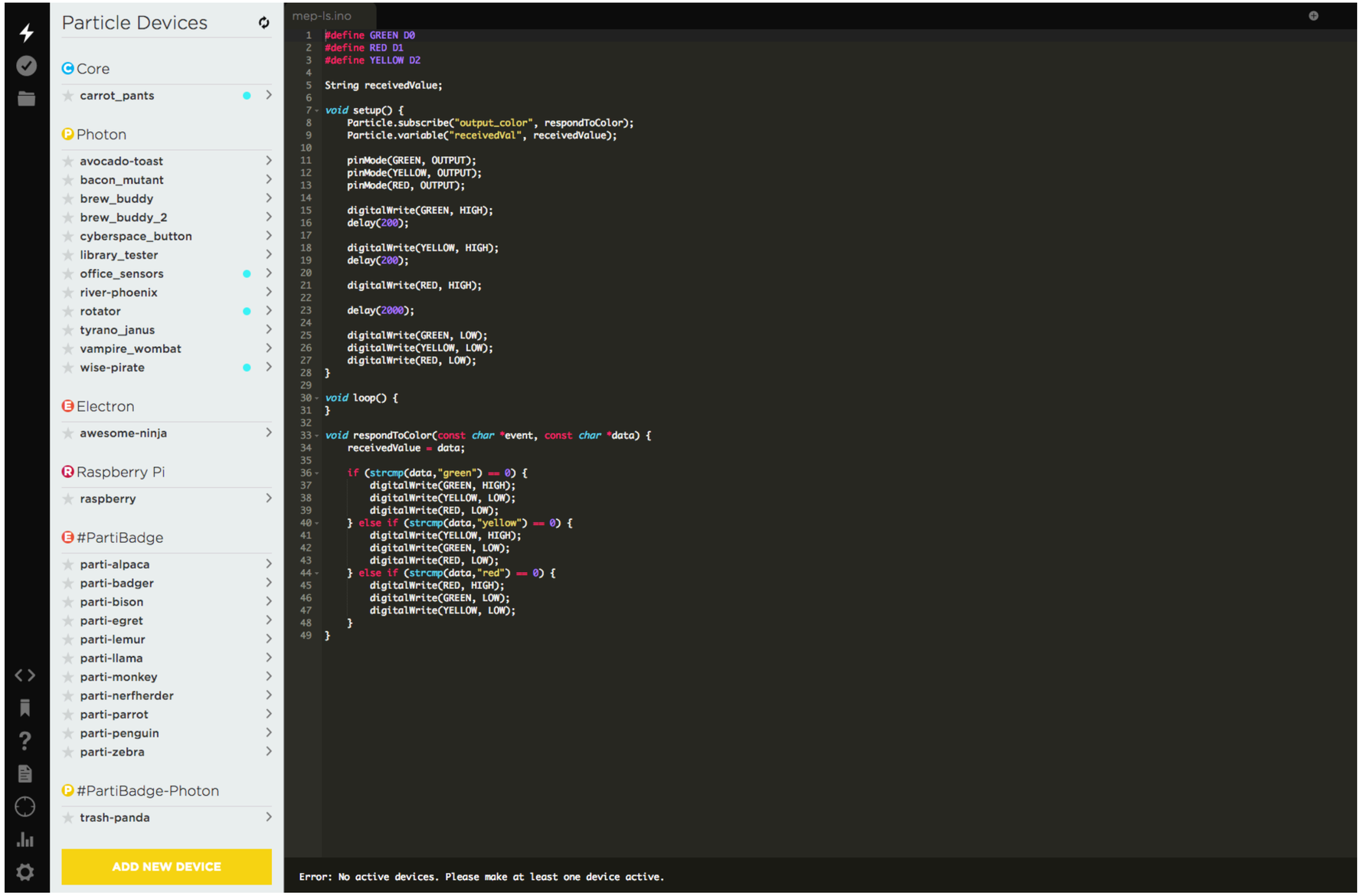


Example Apps Particle provides

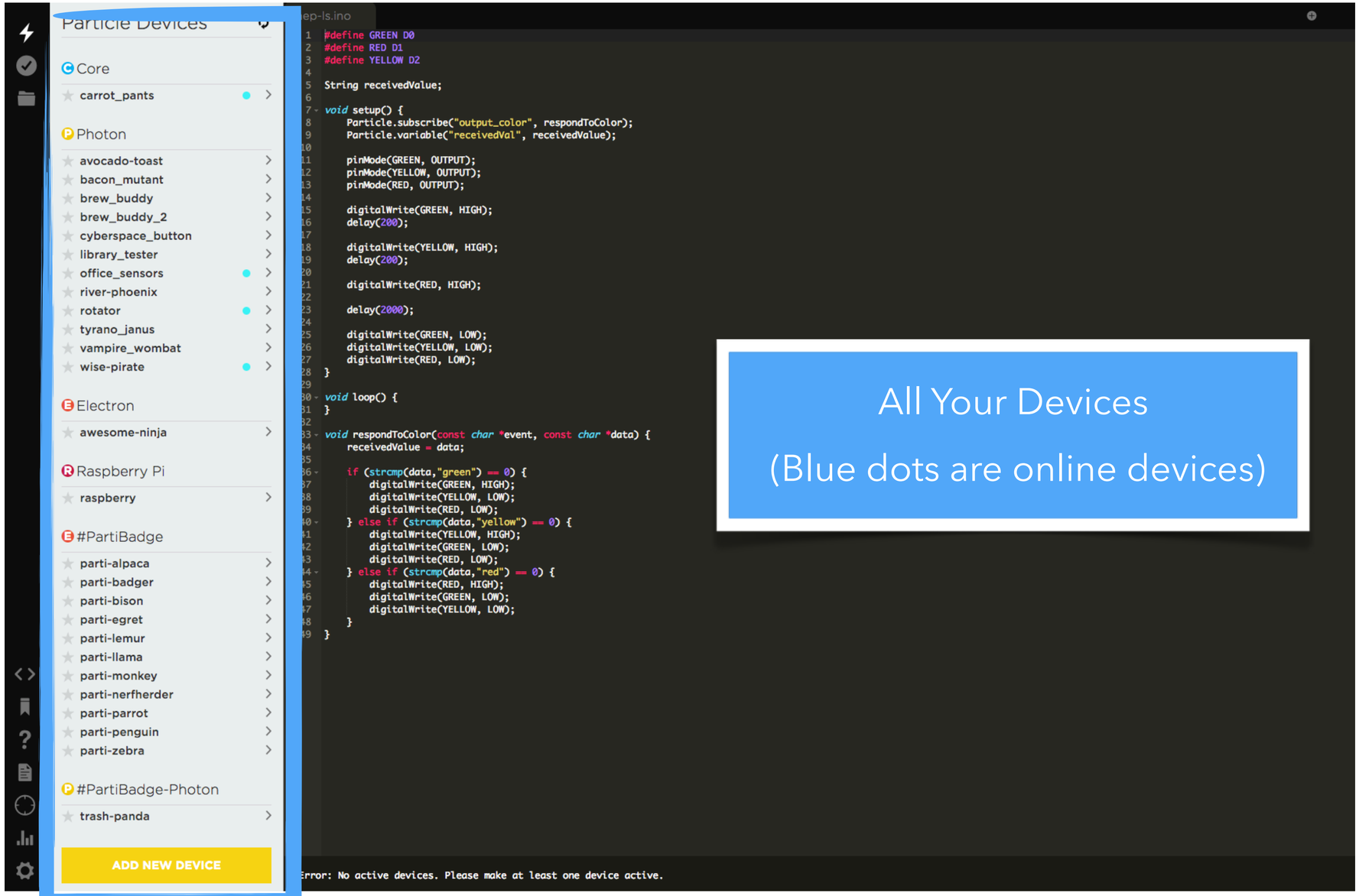
BUILD.PARTICLE.IO (WEB IDE)

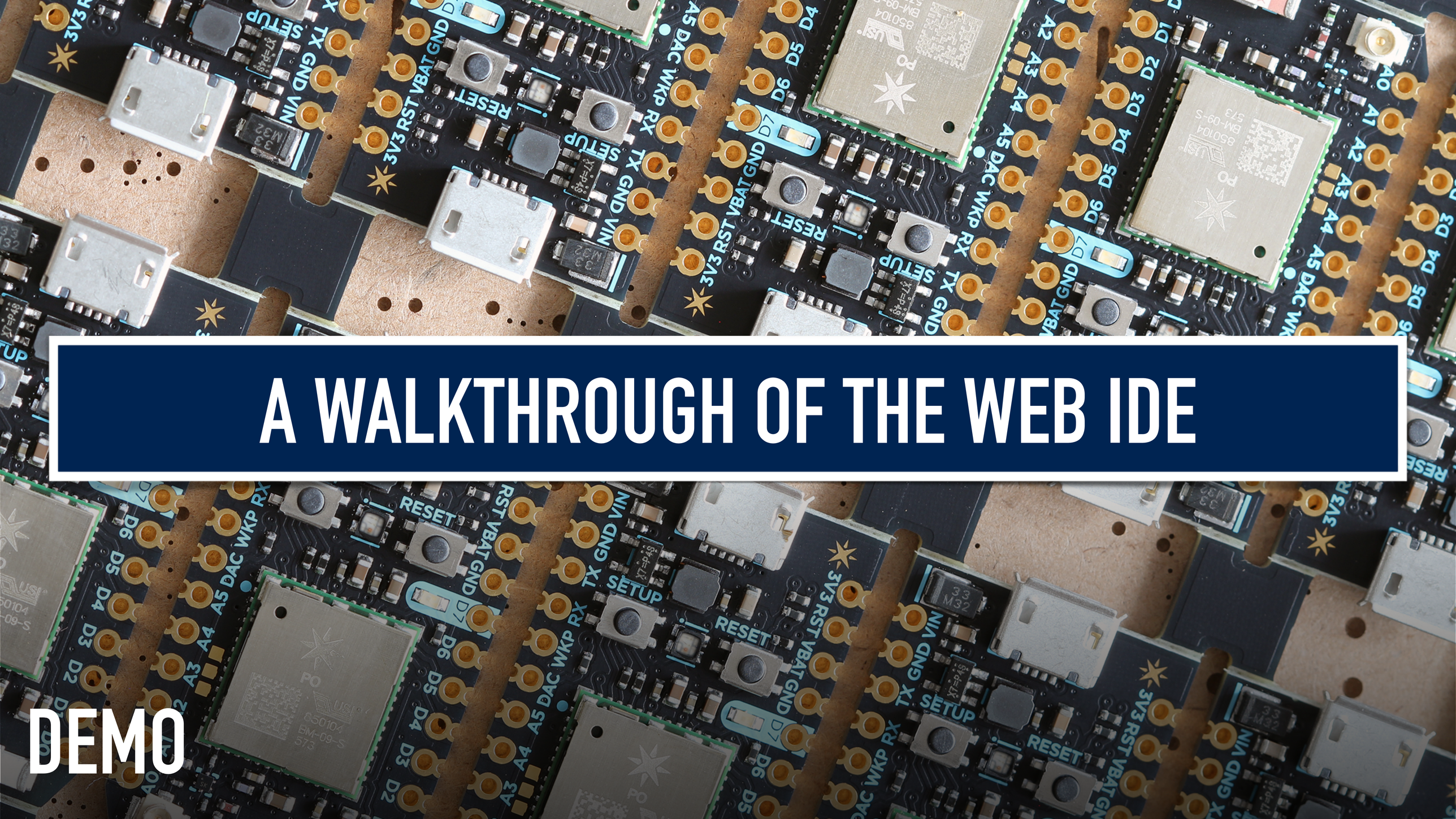


BUILD.PARTICLE.IO (WEB IDE)



BUILD.PARTICLE.IO (WEB IDE)




A WALKTHROUGH OF THE WEB IDE
DEMO

GETTING STARTED WITH THE WEB IDE

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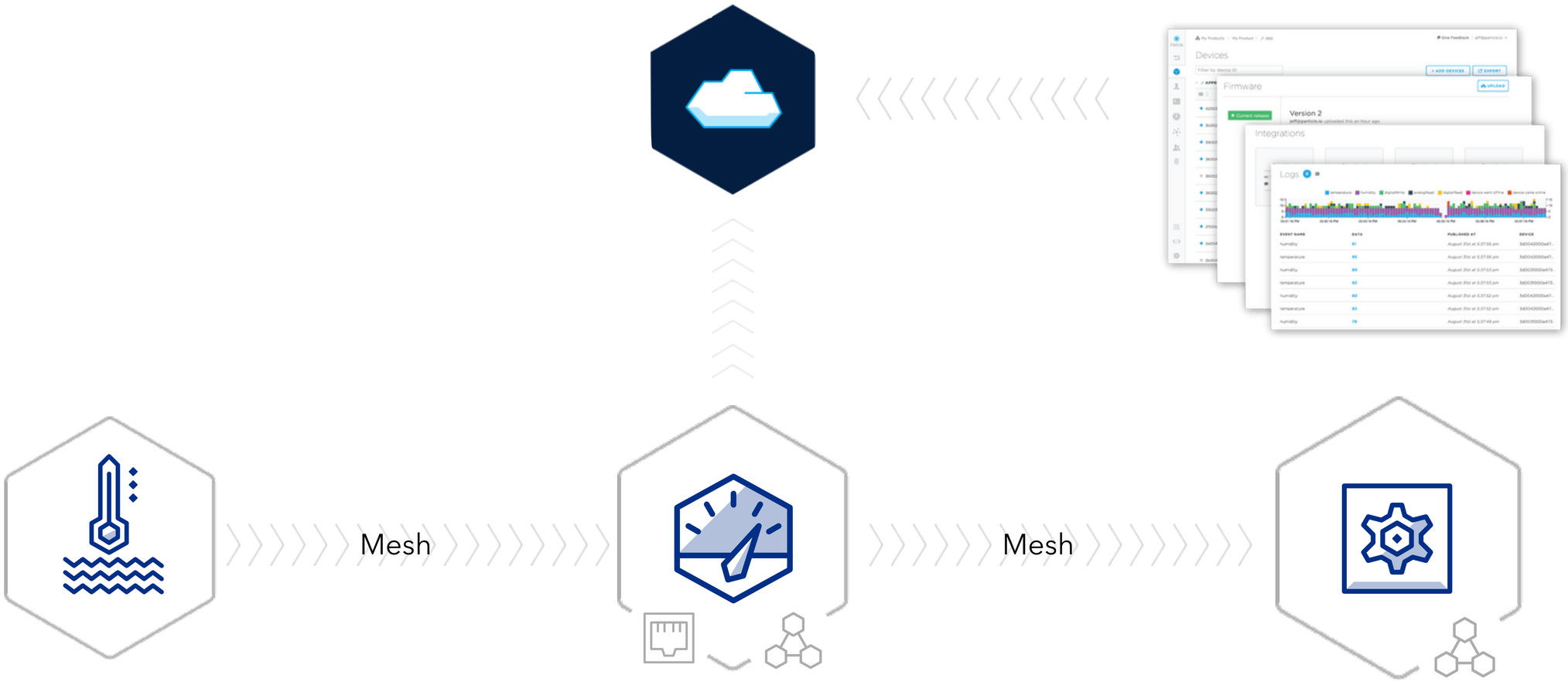
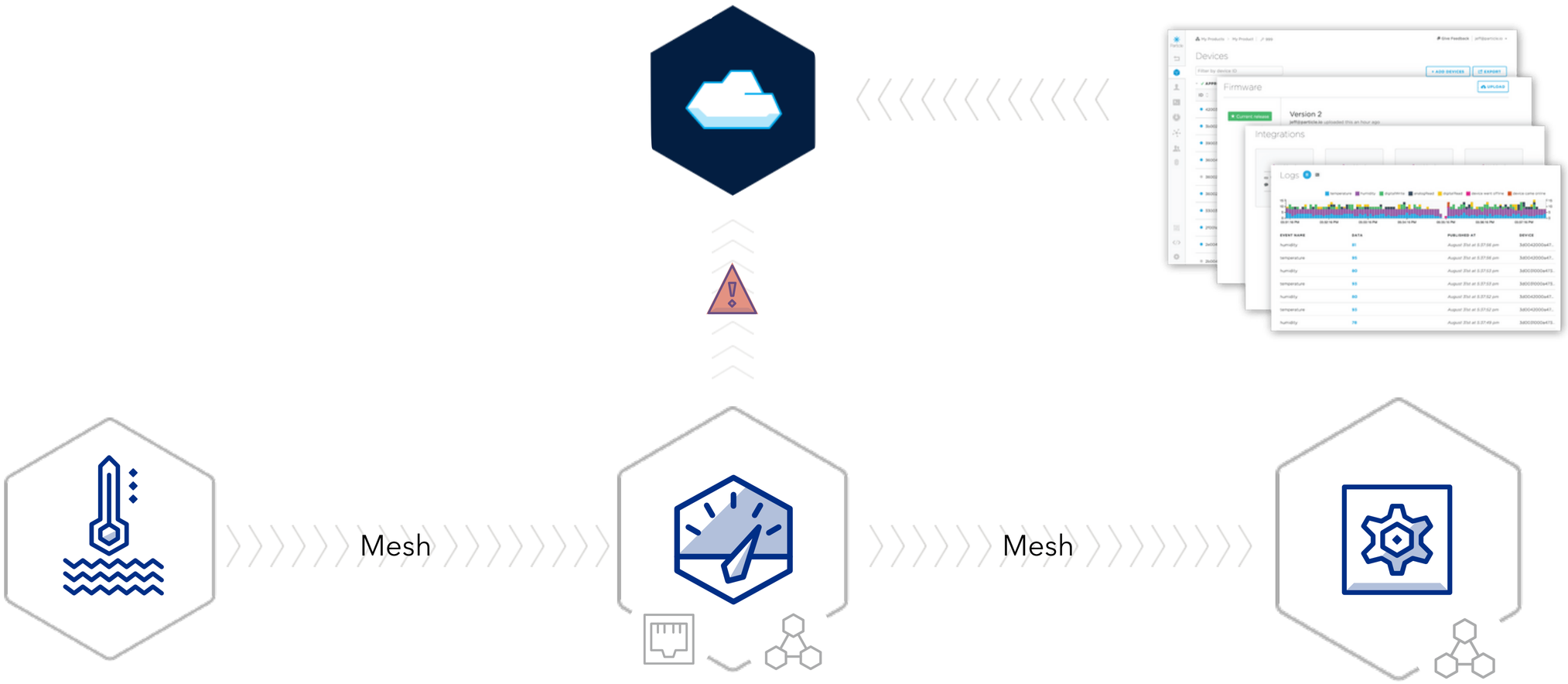
MANAGING DEVICES FROM THE CONSOLE

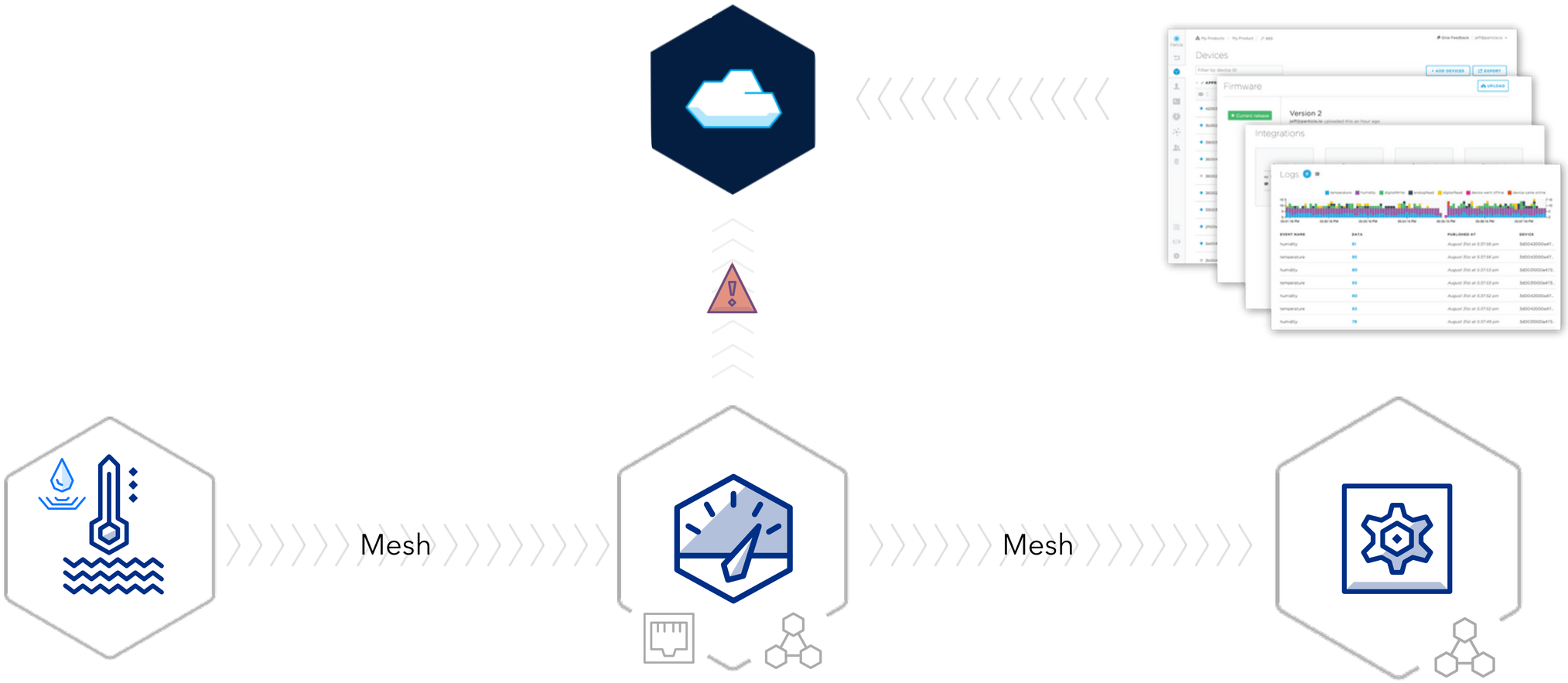
PUB/SUB WITH PARTICLE MESH



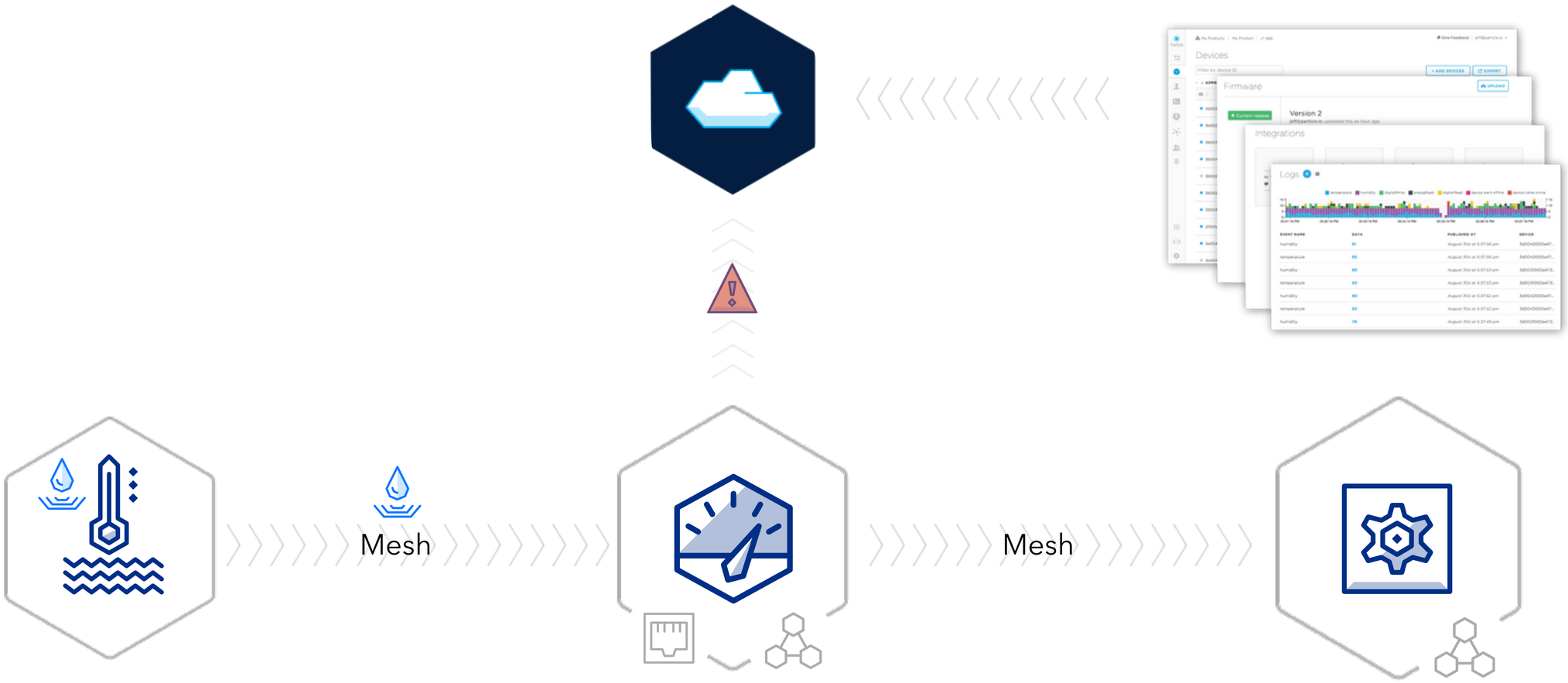
PUB/SUB WITH PARTICLE MESH



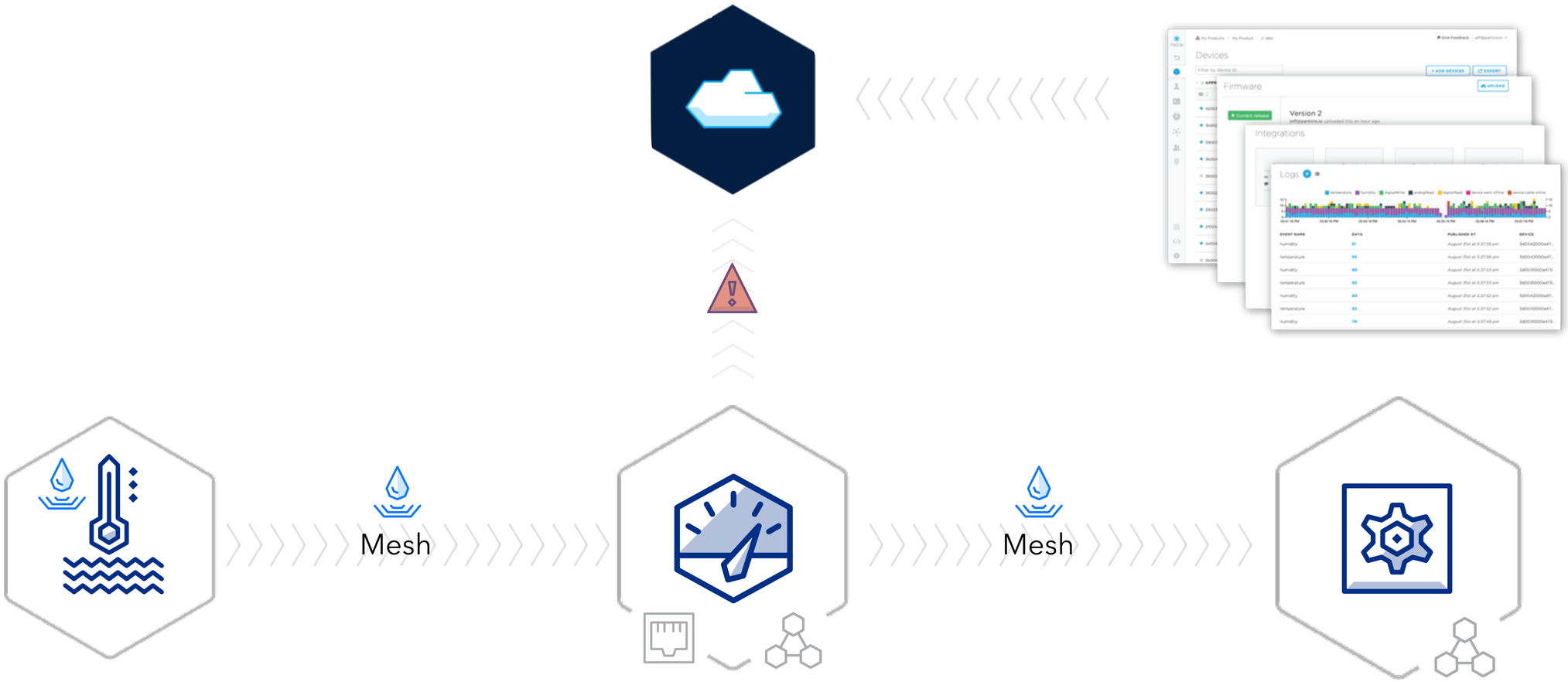
PUB/SUB WITH PARTICLE MESH



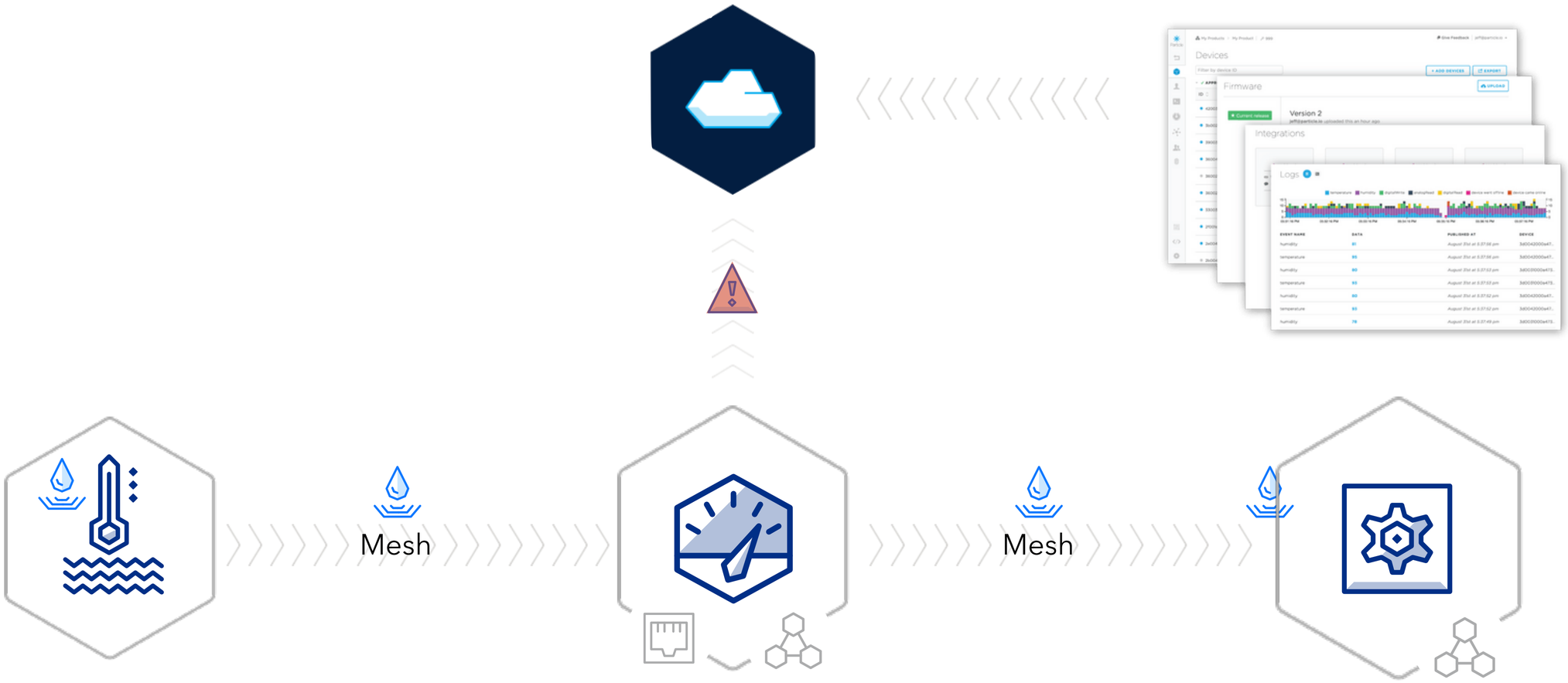
PUB/SUB WITH PARTICLE MESH



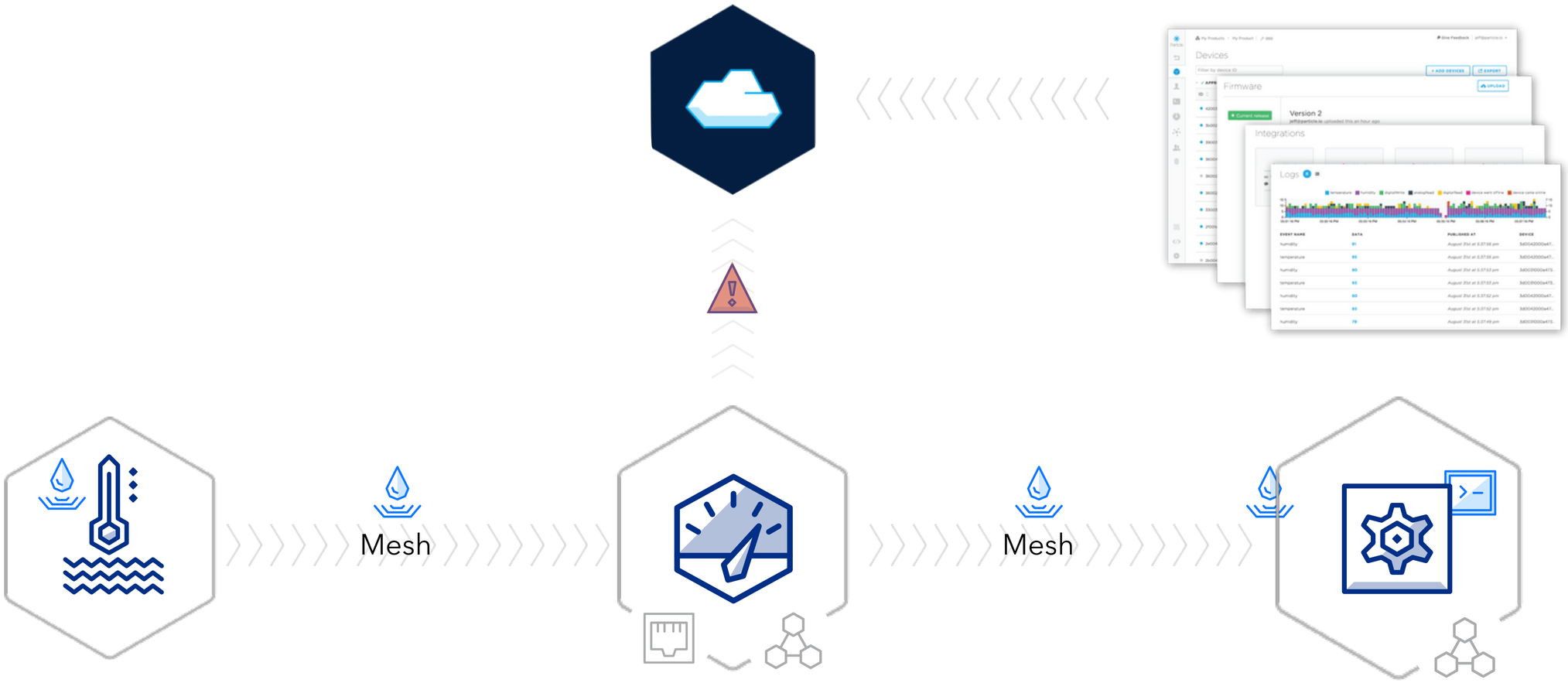
PUB/SUB WITH PARTICLE MESH



PUB/SUB WITH PARTICLE MESH



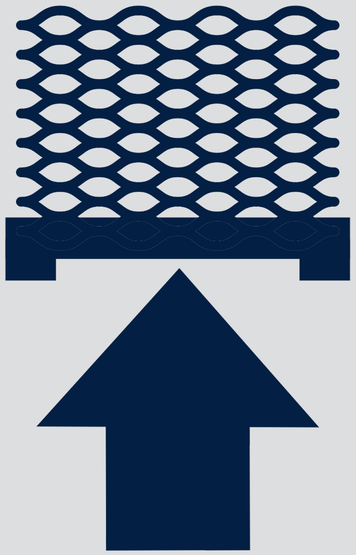
PUB/SUB WITH PARTICLE MESH



PARTICLE MESH FUNCTIONS

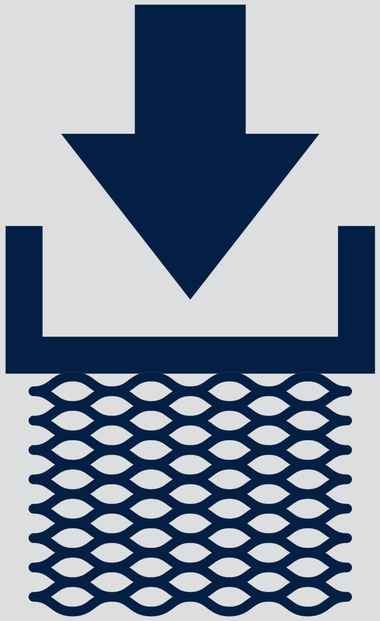
Broadcast an event to all devices in a Mesh network

Mesh.publish()



Listen for events published to the Mesh network

Mesh.subscribe()



MESH.PUBLISH()

What it does:

Publish an event that will be forwarded to all registered listeners on the local Particle mesh network.

Why it's cool:

- Enables mesh network communication
- Works even when the network isn't connected to the cloud

Usage notes:

- 63 characters max for event names

```
double tempC = 0;

void setup()
{
  Particle.variable("temp", tempC);

  pinMode(A0, INPUT);
}

void loop()
{
  analogvalue = analogRead(A0);
  tempC = (((analogvalue * 3.3) / 4095) - 0.5) * 100;

  if (tempC > 120)
  {
    Mesh.publish("temp/critical", tempC);
  }
  else if (tempC > 80)
  {
    Mesh.publish(“temp/warning", tempC);
  }
}
```

MESH.SUBSCRIBE()

What it does:

Subscribe to events published by devices on the local mesh network.

Why it’s cool:

- Enables mesh network communication
- Works even when the network isn’t connected to the cloud

Usage notes:

- Subscriptions work like prefix filters, meaning you can capture multiple publish events via clever naming.

```
void setup()
{
  // Subscribes to temp/warning AND temp/critical
  Mesh.subscribe(“temp", handleTemp);
}

void handleTemp(const char *event, const char *data)
{
  double temp = extractTemp(data);

  if (temp > 120)
  {
    deactivatePump();
  }
  else if (temp > 80)
  {
    reducePumpSpeed();
  }
}
```

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MESH PUBLISH & SUBSCRIBE

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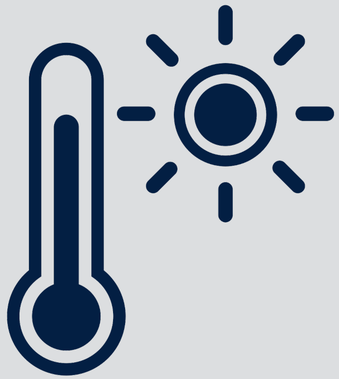
PARTICLE CLOUD FUNCTIONS

Call a function, remotely

Particle.function()

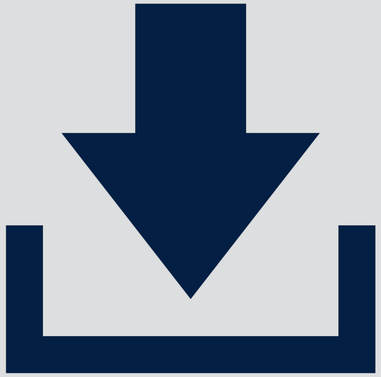


Fetch a variable, remotely

Particle.variable()

Send an event to the cloud

Particle.publish()



Listen for events

Particle.subscribe()

PARTICLE.VARIABLE()

What it does:

Expose a firmware variable to the cloud

Why it's cool:

- Can be fetched via the Device Cloud API
- Viewable from the Device Console

Usage notes:

- 20 variables max.
- 12 character limit per variable name

```
int analogvalue = 0;
double tempC = 0;

void setup()
{
  // variable name max length is 12 characters long
  Particle.variable("analogvalue", analogvalue);
  Particle.variable("temp", tempC);

  // Setup for Sensor on A0
  pinMode(A0, INPUT);
}

void loop()
{
  // Read the analog value of the sensor
  analogvalue = analogRead(A0);

  //Convert the reading into degrees Celsius
  tempC = (((analogvalue * 3.3)/4095) - 0.5) * 100;
  delay(200);
}
```

PARTICLE.VARIABLE()

What it does:

Expose a firmware variable to the cloud

Why it's cool:

- Can be fetched via the Device Cloud API
- Viewable from the Device Console

Usage notes:

- 20 variables max.
- 12 character limit per variable name

```
int analogvalue = 0;
double tempC = 0;

void setup()
{
```

```
# EXAMPLE REQUEST IN TERMINAL
# Device ID is 0123456789abcdef
# Your access token is 123412341234
curl "https://api.particle.io/v1/devices/0123456789abcdef/
analogvalue?access_token=123412341234"
curl "https://api.particle.io/v1/devices/0123456789abcdef/
temp?access_token=123412341234"

# In return you'll get something like this:
960
27.44322344322344
```

```
  //Convert the reading into degrees Celsius
  tempC = (((analogvalue * 3.3)/4095) - 0.5) * 100;
  delay(200);
}
```

PARTICLE.FUNCTION()

What it does:

Expose a firmware function to the cloud

Why it's cool:

- Can be called via the Device Cloud API
- Callable from the Device Console

Usage notes:

- 15 functions max.
- 12 character limit per function name

```
int togglePump(String command);

void setup()
{
  // register the cloud function
  Particle.function("togglePump", togglePump);
}

// this function automagically gets called upon a matching
POST request
int togglePump(String command)
{
  if (command == "on")
  {
    activateWaterPump();
  }
  else
  {
    deactivatePump();
  }

  return 1;
}
```

PARTICLE.FUNCTION()

What it does:

Expose a firmware function to the cloud

Why it's cool:

- Can be called via the Device Cloud API
- Callable from the Device Console

Usage notes:

- 15 functions max.
- 12 character limit per function name

```
int togglePump(String command);

void setup()
{
```

```
# API Call
# GET /v1/devices/{DEVICE_ID}/{VARIABLE}

# EXAMPLE REQUEST IN TERMINAL
# Device ID is 0123456789abcdef
# Your access token is 123412341234
curl "https://api.particle.io/v1/devices/0123456789abcdef/
analogvalue?access_token=123412341234"
curl "https://api.particle.io/v1/devices/0123456789abcdef/
temp?access_token=123412341234"

# In return you'll get something like this:
960
27.44322344322344
```

```
  }

  return 1;
}
```

PARTICLE.PUBLISH()

What it does:

Publish an event that will be forwarded to all registered listeners.

Why it's cool:

- Enables device-to-device communication
- Viewable from the Device Console

Usage notes:

- 63 characters max for event names
- Events are public by default, but can be marked as private.

```
double tempC = 0;

void setup()
{
  Particle.variable("temp", tempC);

  pinMode(A0, INPUT);
}

void loop()
{
  analogvalue = analogRead(A0);
  tempC = (((analogvalue * 3.3) / 4095) - 0.5) * 100;

  if (tempC > 120)
  {
    Particle.publish("temp/critical", tempC);
  }
  else if (tempC > 80)
  {
    Particle.publish("temp/warning", tempC);
  }
}
```

PARTICLE.PUBLISH()

What it does:

Publish an event that will be forwarded to all registered listeners.

Why it's cool:

- Enables device-to-device communication
- Viewable from the Device Console

Usage notes:

- 63 characters max for event names
- Events are public by default, but can be marked as private.

```
double tempC = 0;

void setup()
{
```

```
# API Call
# GET /v1/events/{EVENT_NAME}

# EXAMPLE REQUEST
curl -H "Authorization: Bearer {ACCESS_TOKEN_GOES_HERE}" \
https://api.particle.io/v1/events/temp/critical

# Will return a stream that echoes text when your event is
published
event: temp/critical
data:
{"data":"125","ttl":"60","published_at":"2018-05-28T19:20:34
.638Z",
  "deviceid":"0123456789abcdef"}
```

```
    Particle.publish("temp/warning", tempC);
  }
}
```

PARTICLE.SUBSCRIBE()

What it does:

Subscribe to events published by devices.

Why it's cool:

- Enables device-to-device communication
- Non-IoT devices can also trigger events

Usage notes:

- 4 subscribe handlers per device, max
- Subscriptions work like prefix filters, meaning you can capture multiple publish events via clever naming.

```
void setup()
{
  // Subscribes to temp/warning AND temp/critical
  Particle.subscribe("temp", handleTemp);
}

void handleTemp(const char *event, const char *data)
{
  double temp = extractTemp(data);

  if (temp > 120)
  {
    deactivatePump();
  }
  else if (temp > 80)
  {
    reducePumpSpeed();
  }
}
```

LOCAL MESH PUB/SUB VS. PARTICLE CLOUD PUB/SUB

Mesh Pub/Sub is for local messages

Use Mesh Pub/Sub When:

- You need to communicate between devices *only* on a mesh
- You need messages to be sent as fast as possible
- You need to communicate between devices when a connection to the cloud is unavailable.
- It's ok that not *every* message is delivered.

Particle Pub/Sub is for everything else

Use Particle Pub/Sub When:

- You need to communicate between mesh networks or with devices not on a mesh network
- You're publishing events to webhooks or cloud integrations (Azure, Google Cloud, etc.)
- You need some QOS in message delivery (retry attempts, etc.)

GETTING STARTED WITH THE WEB IDE

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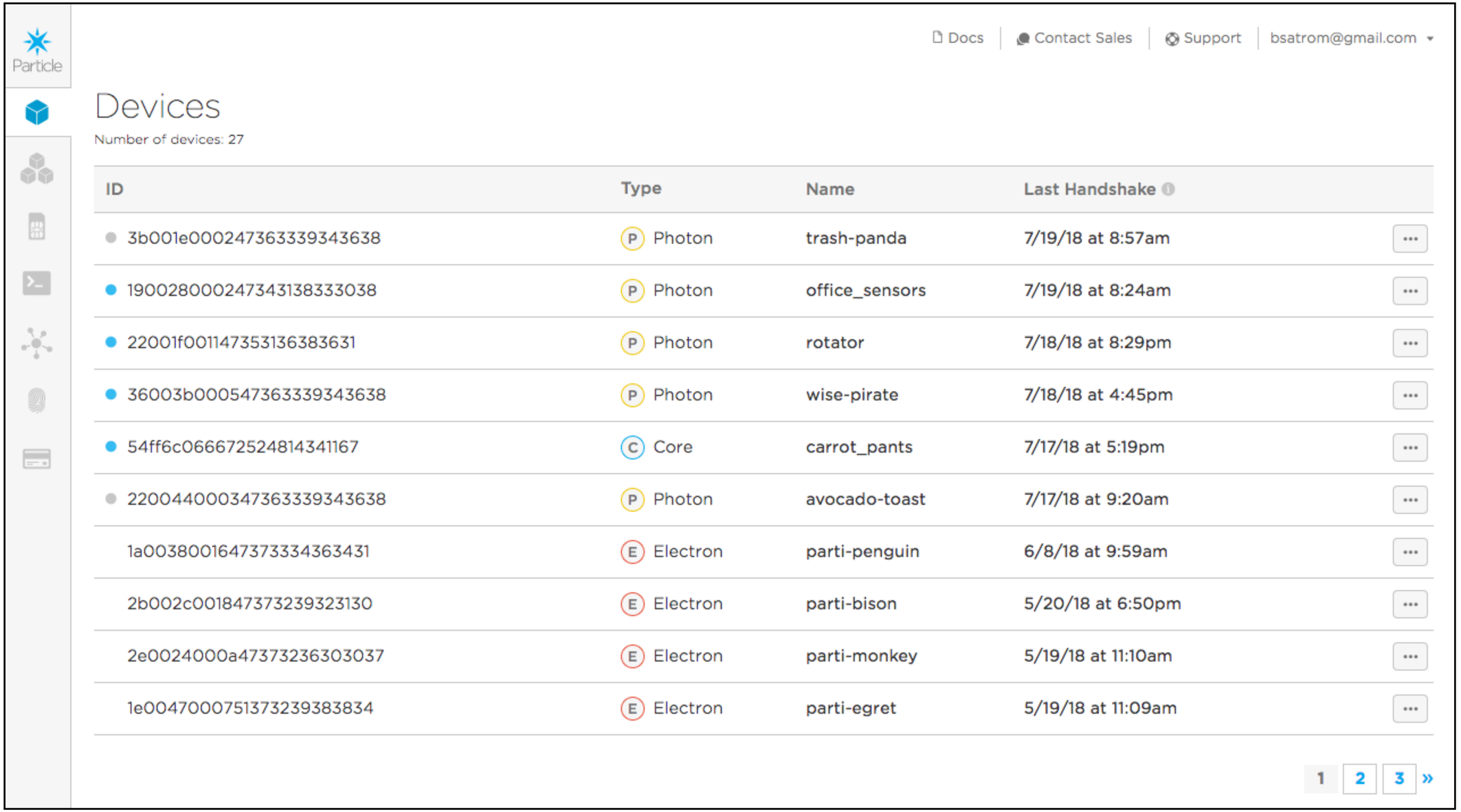
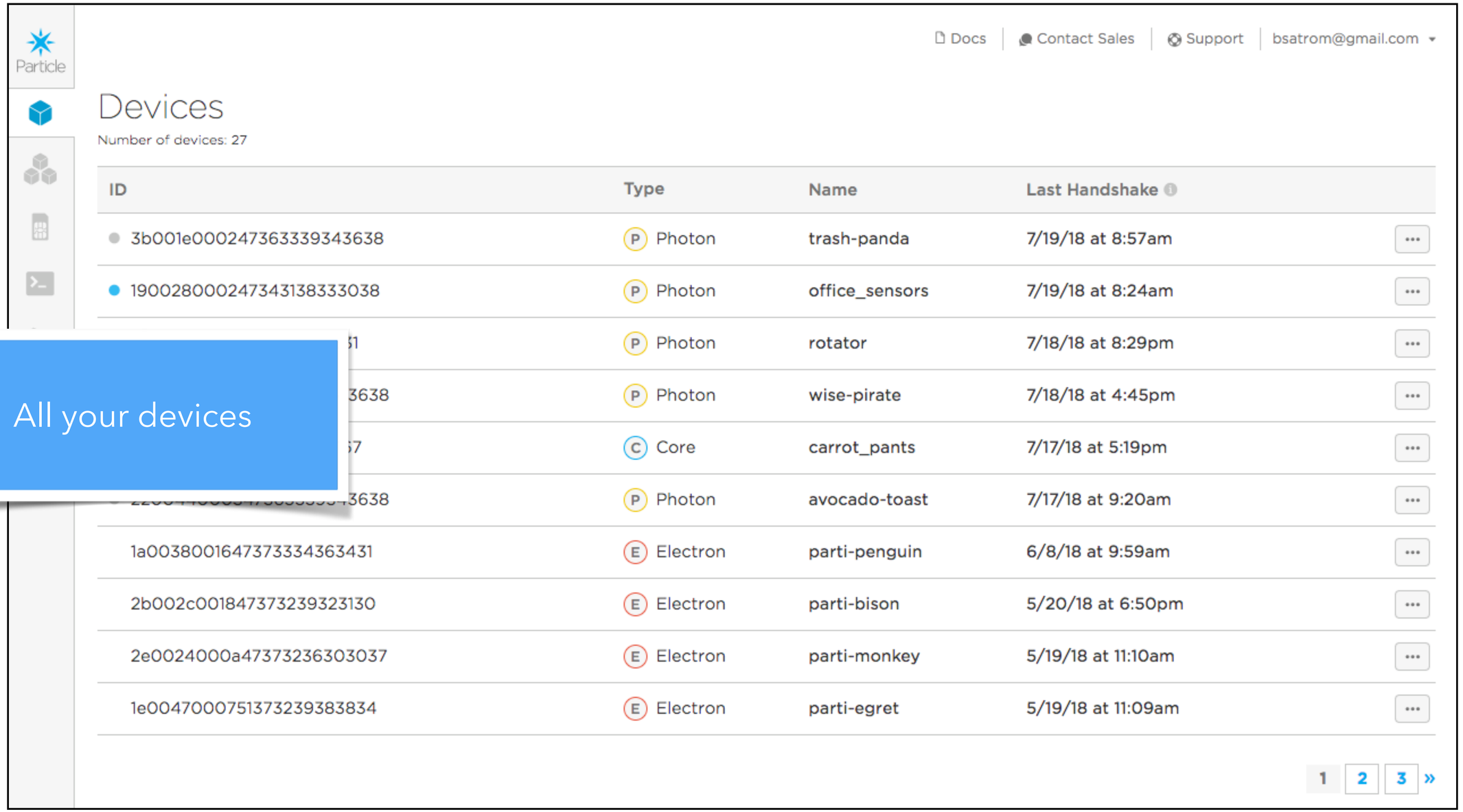
CONSOLE.PARTICLE.IO

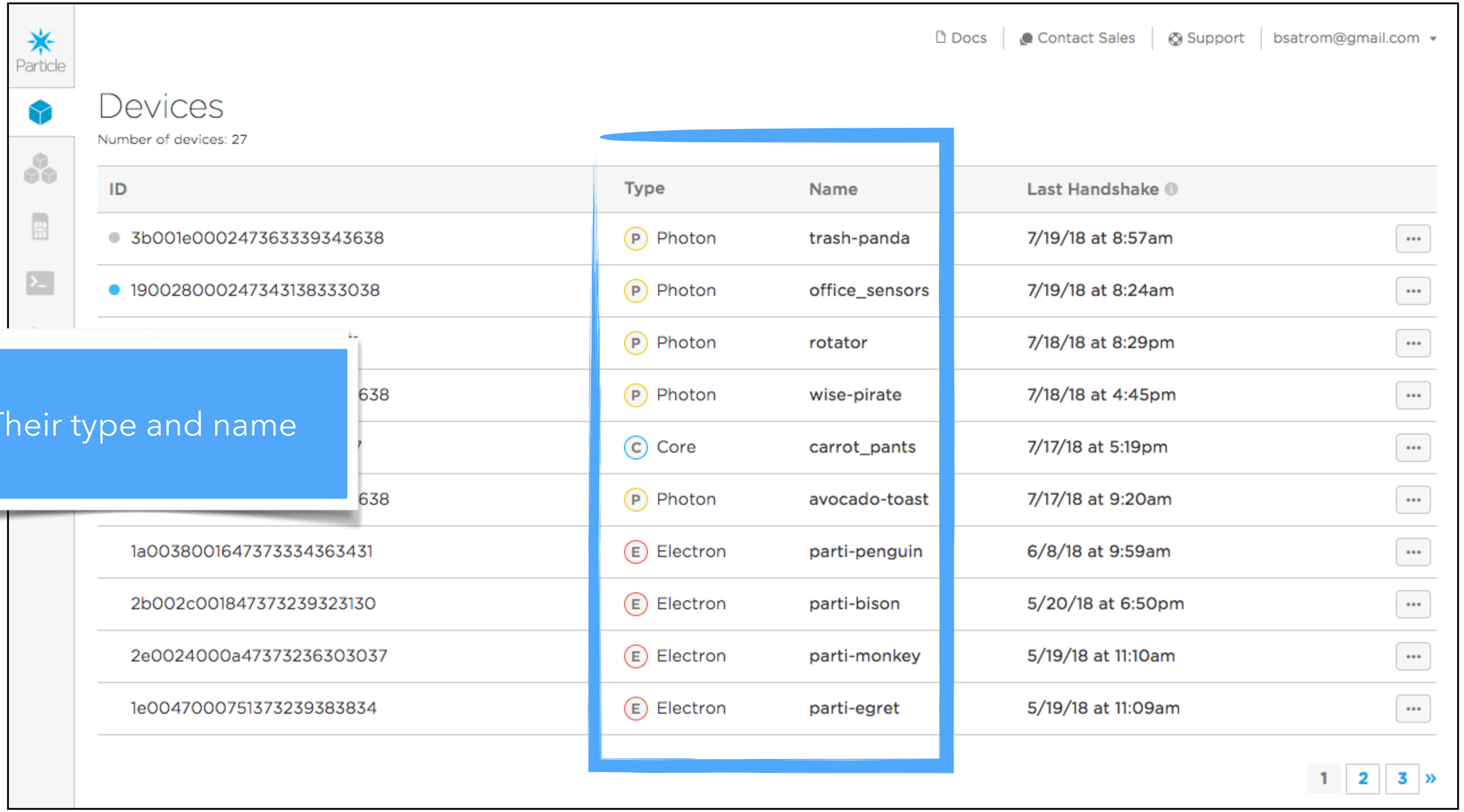


CONSOLE.PARTICLE.IO

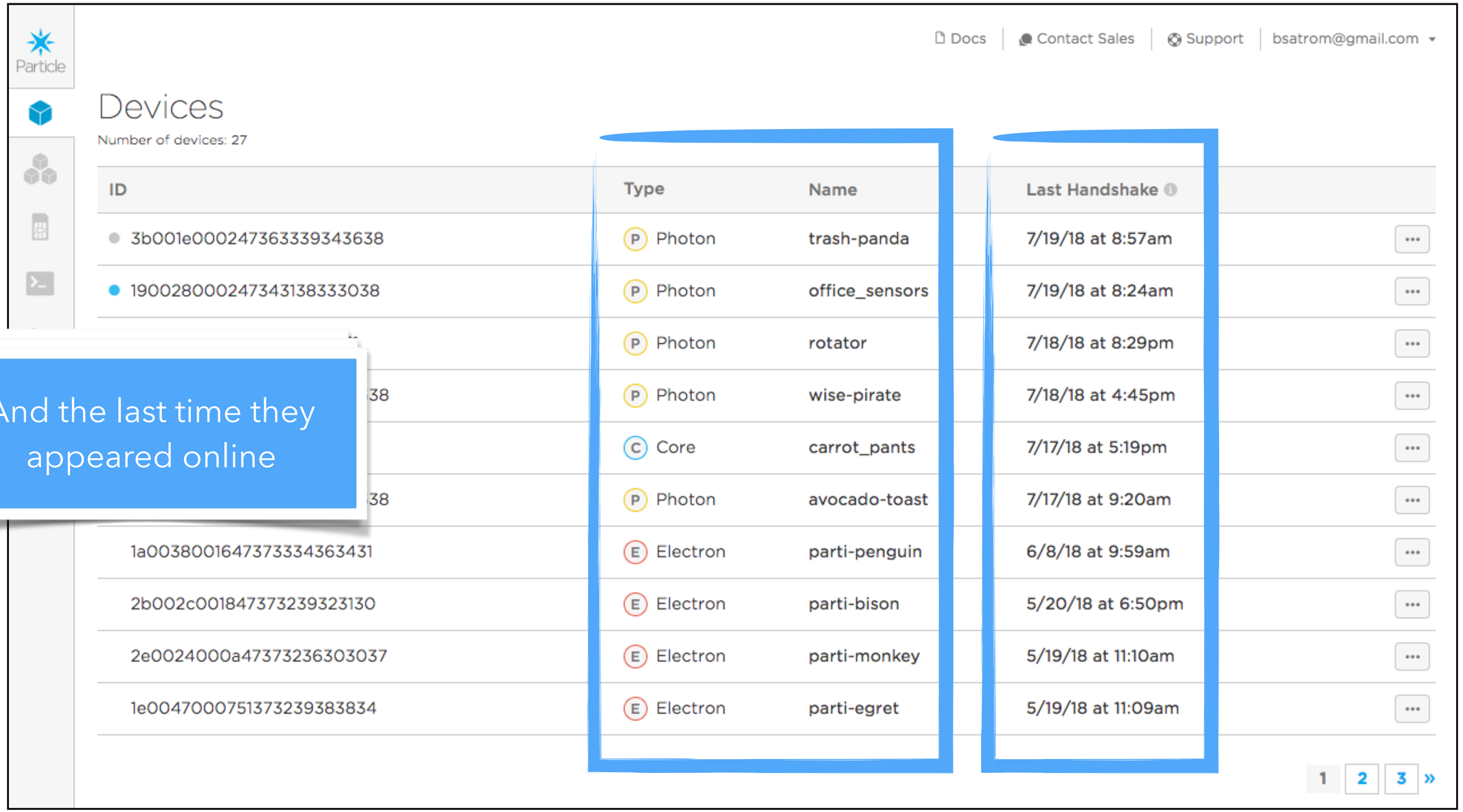


All your devices

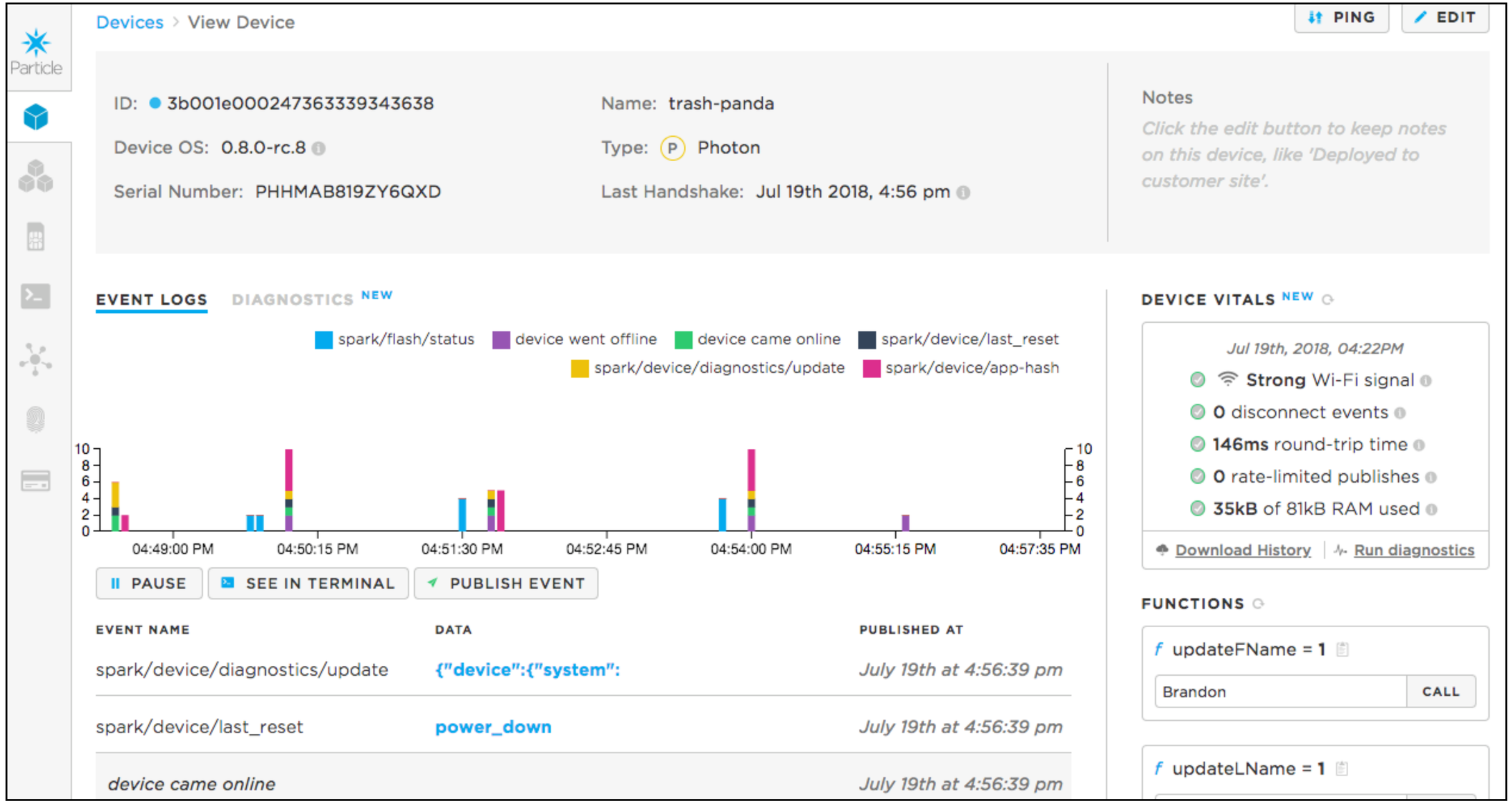
CONSOLE.PARTICLE.IO



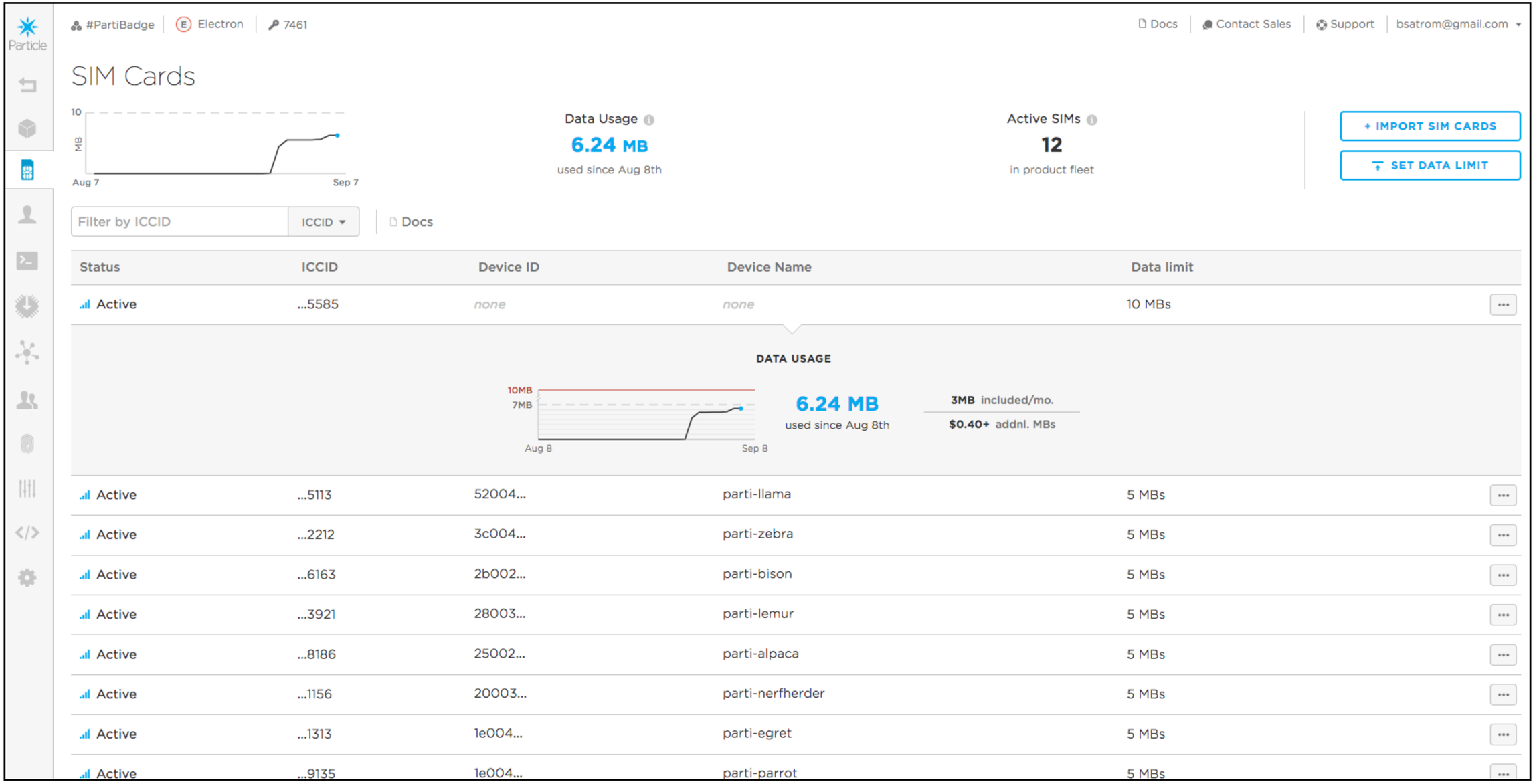
CONSOLE.PARTICLE.IO



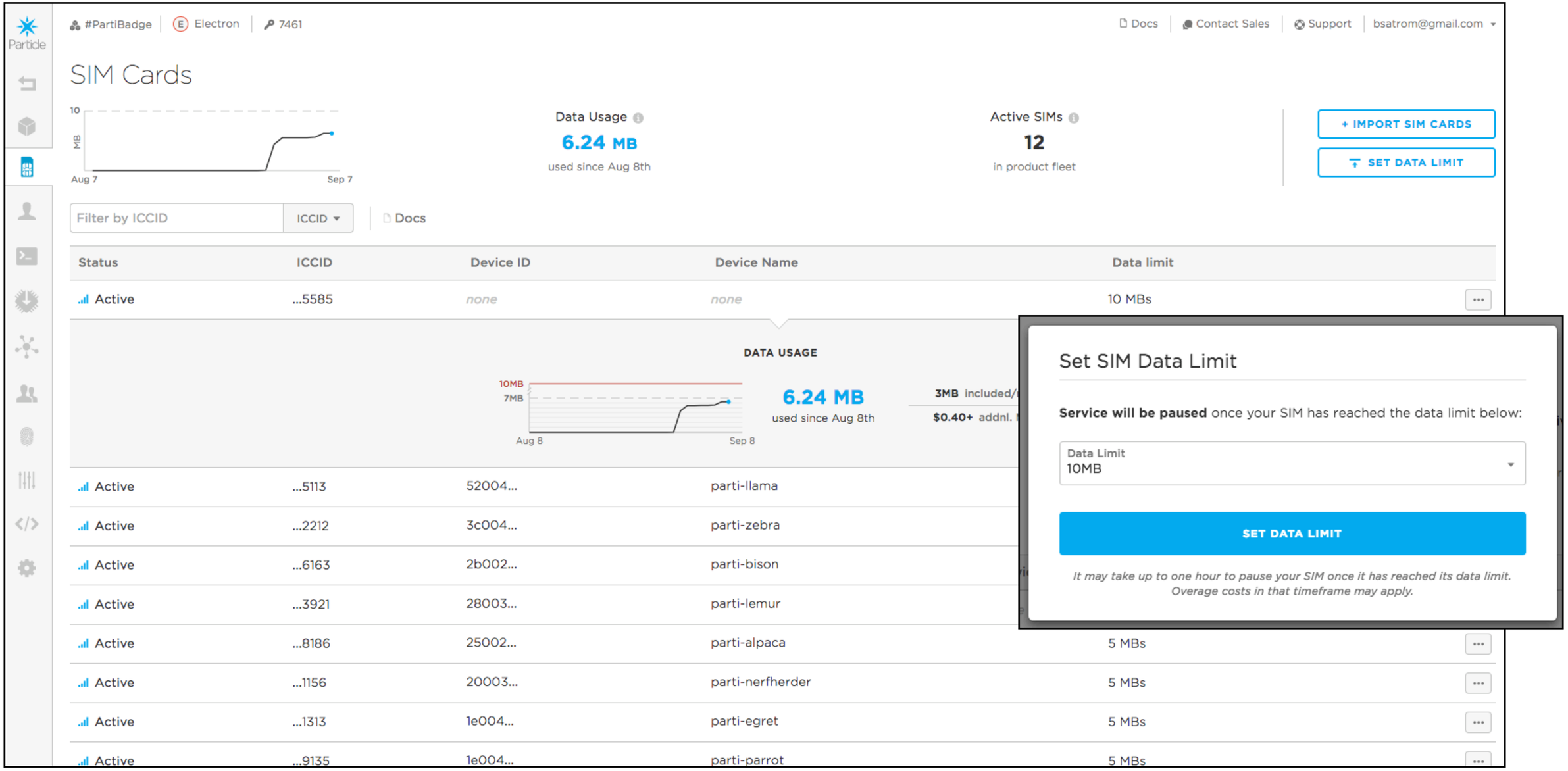
REAL-TIME EVENT LOGS



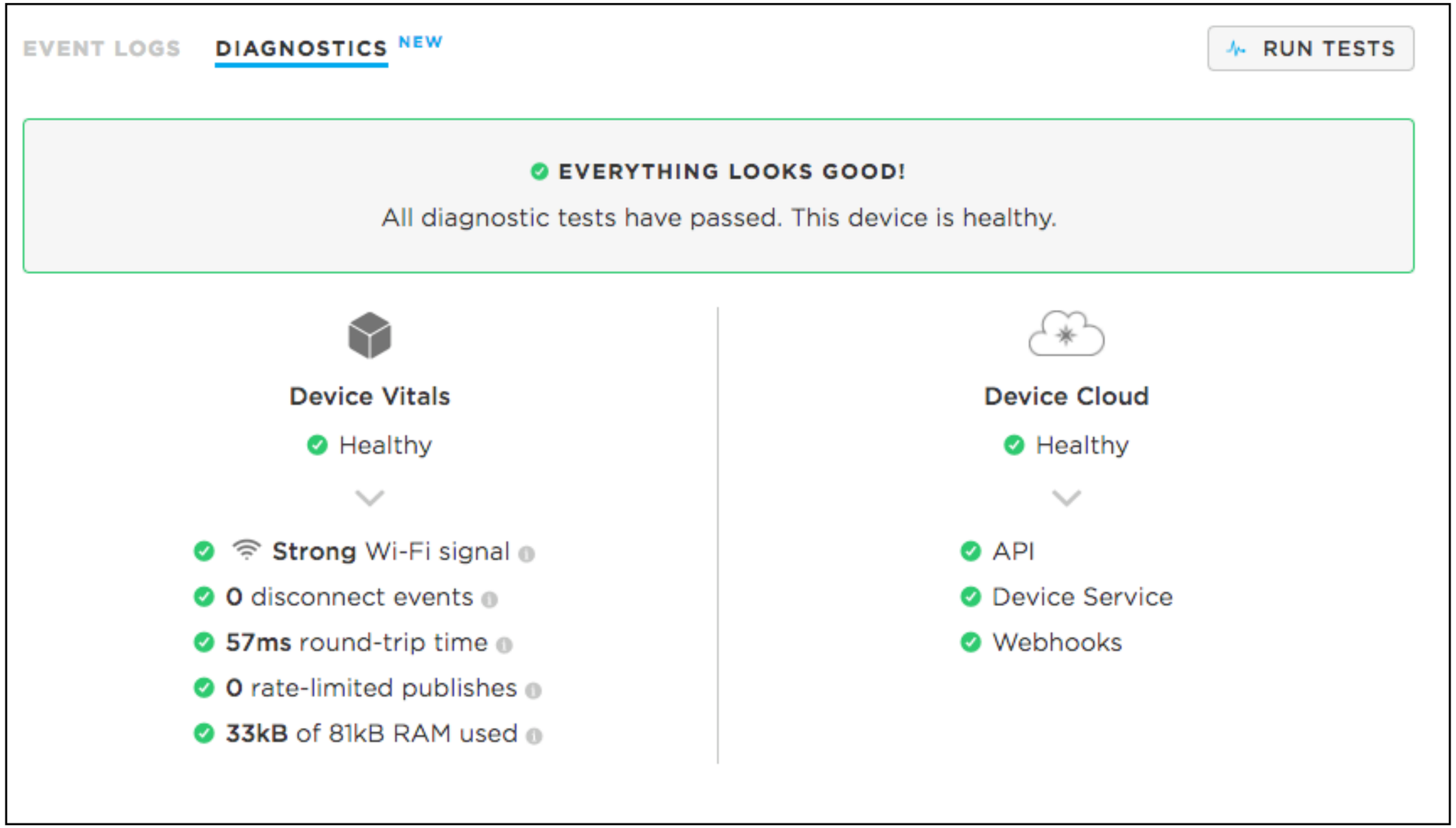
SIM MANAGEMENT



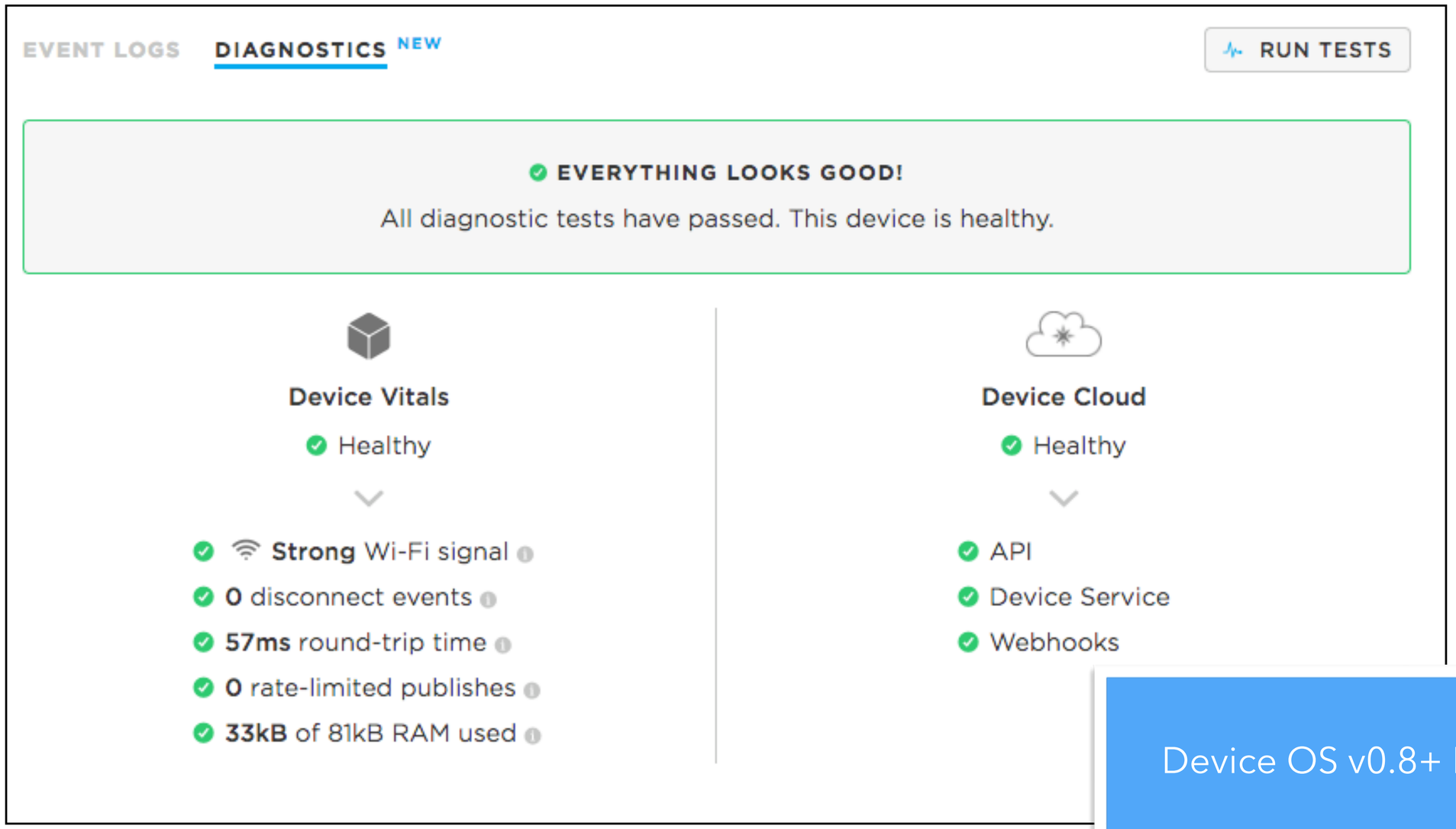
SIM MANAGEMENT



REMOTE DIAGNOSTICS

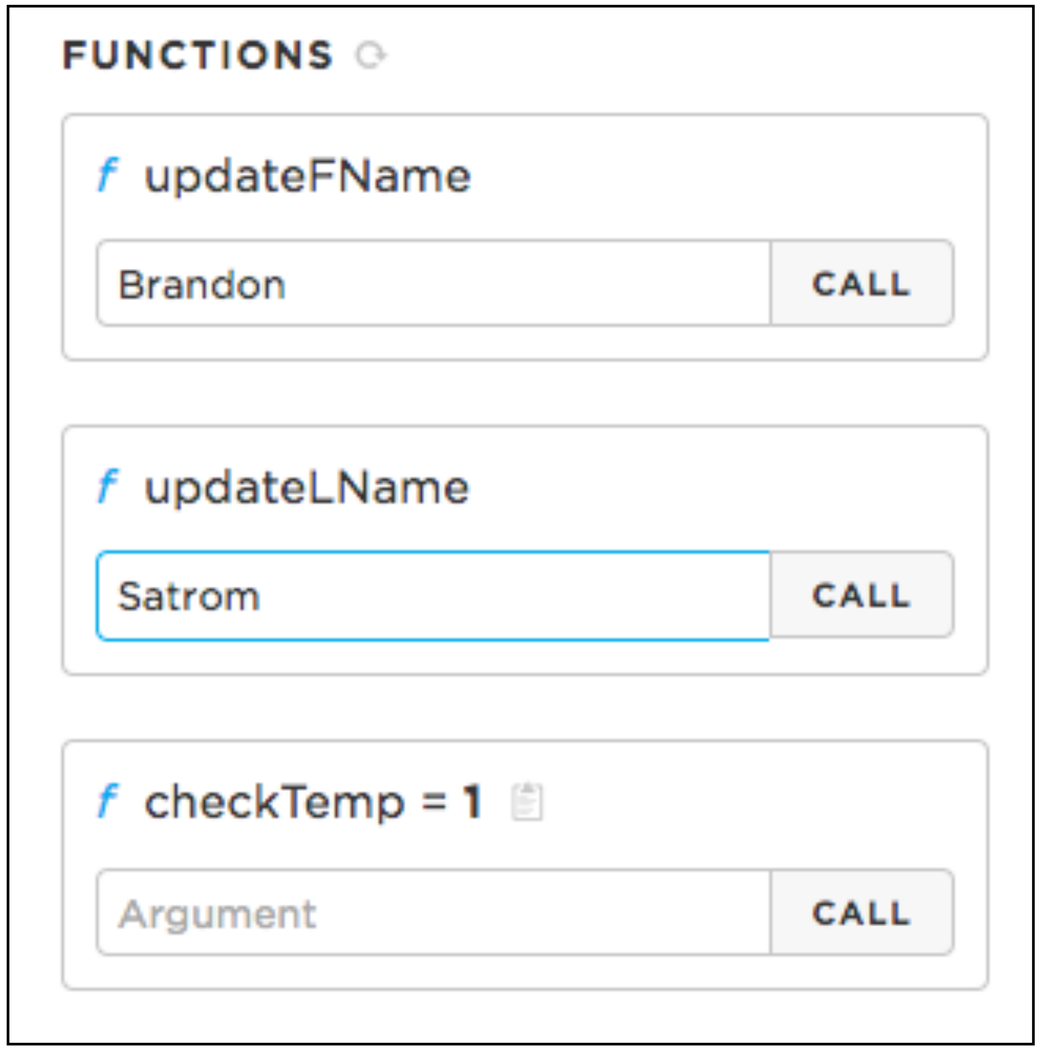


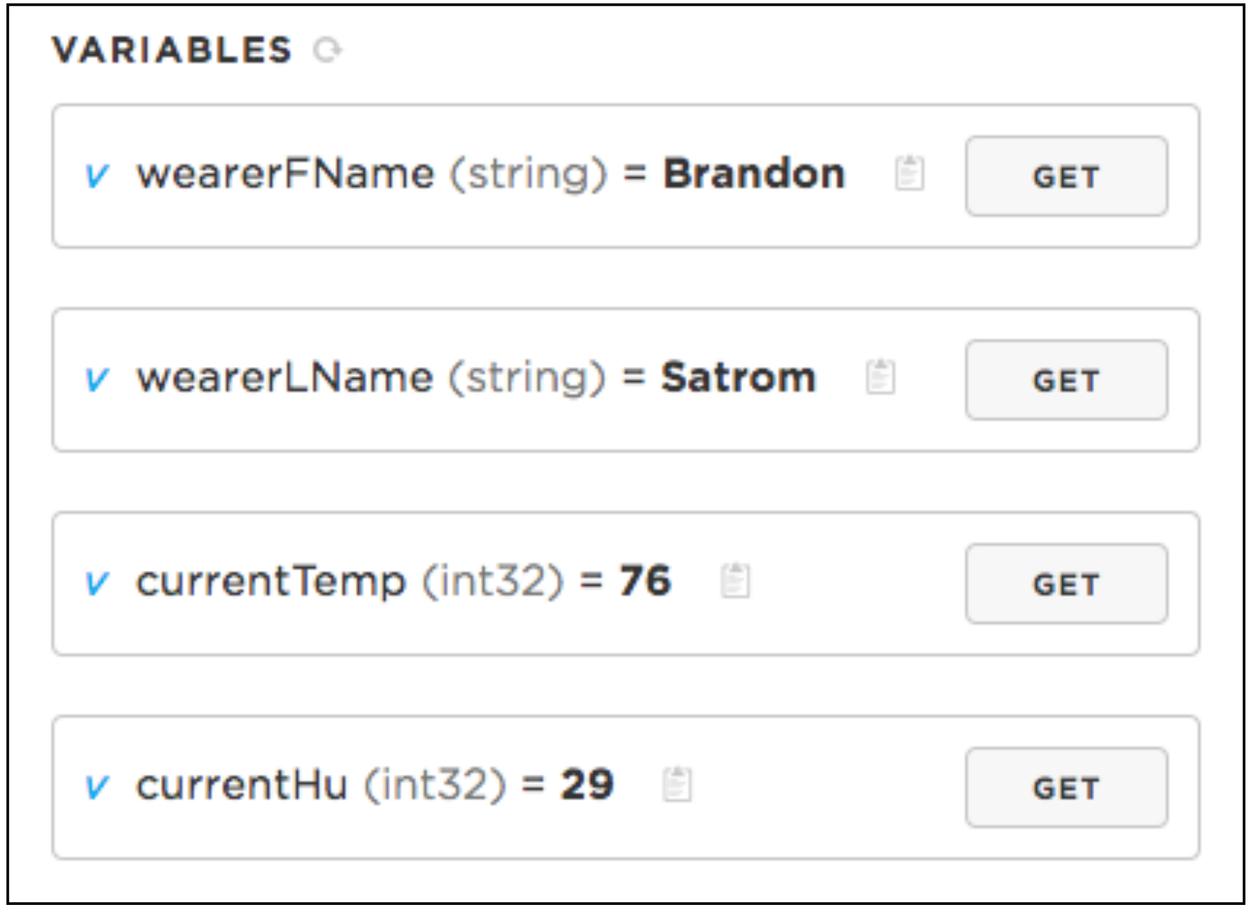
REMOTE DIAGNOSTICS

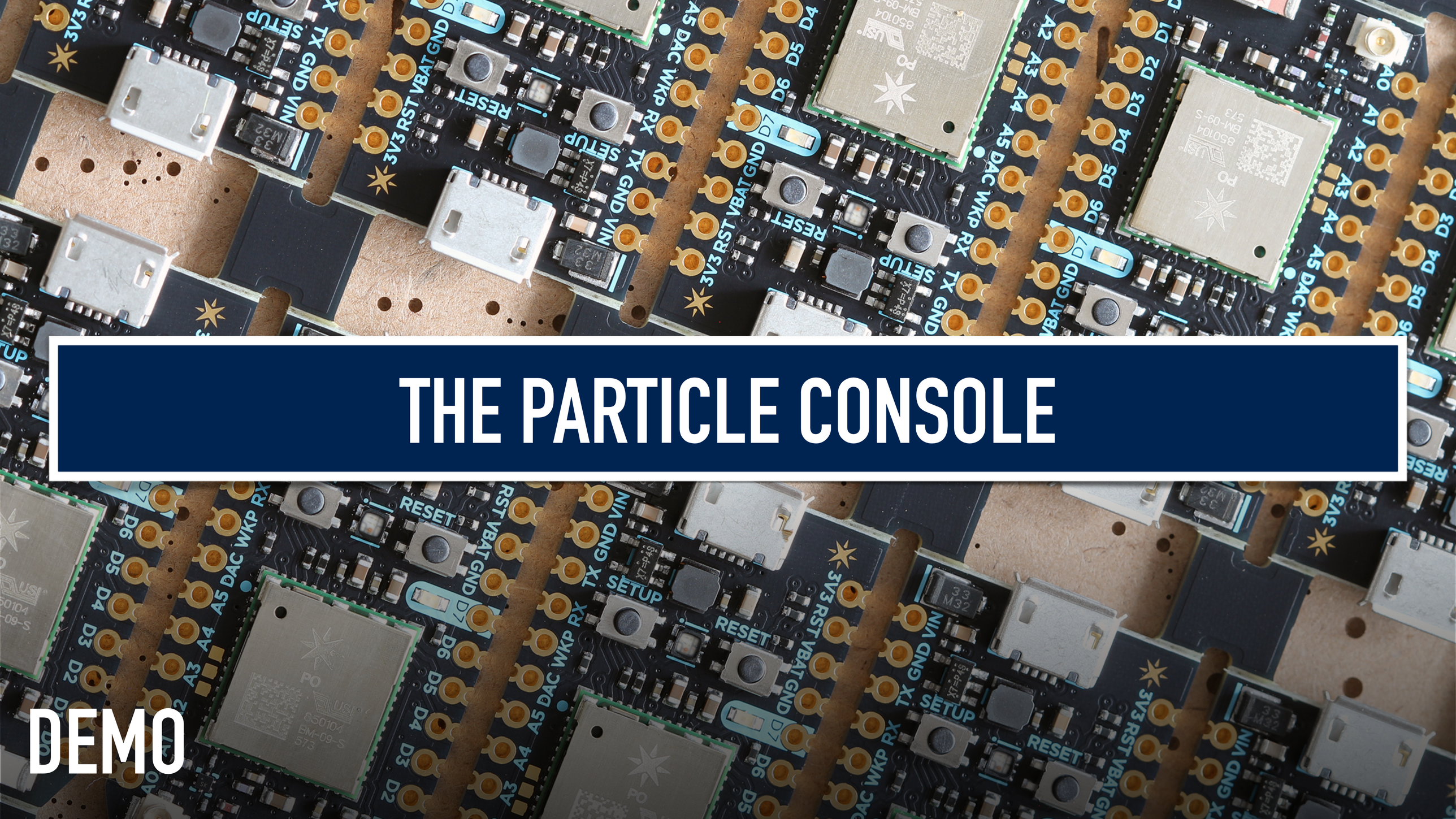


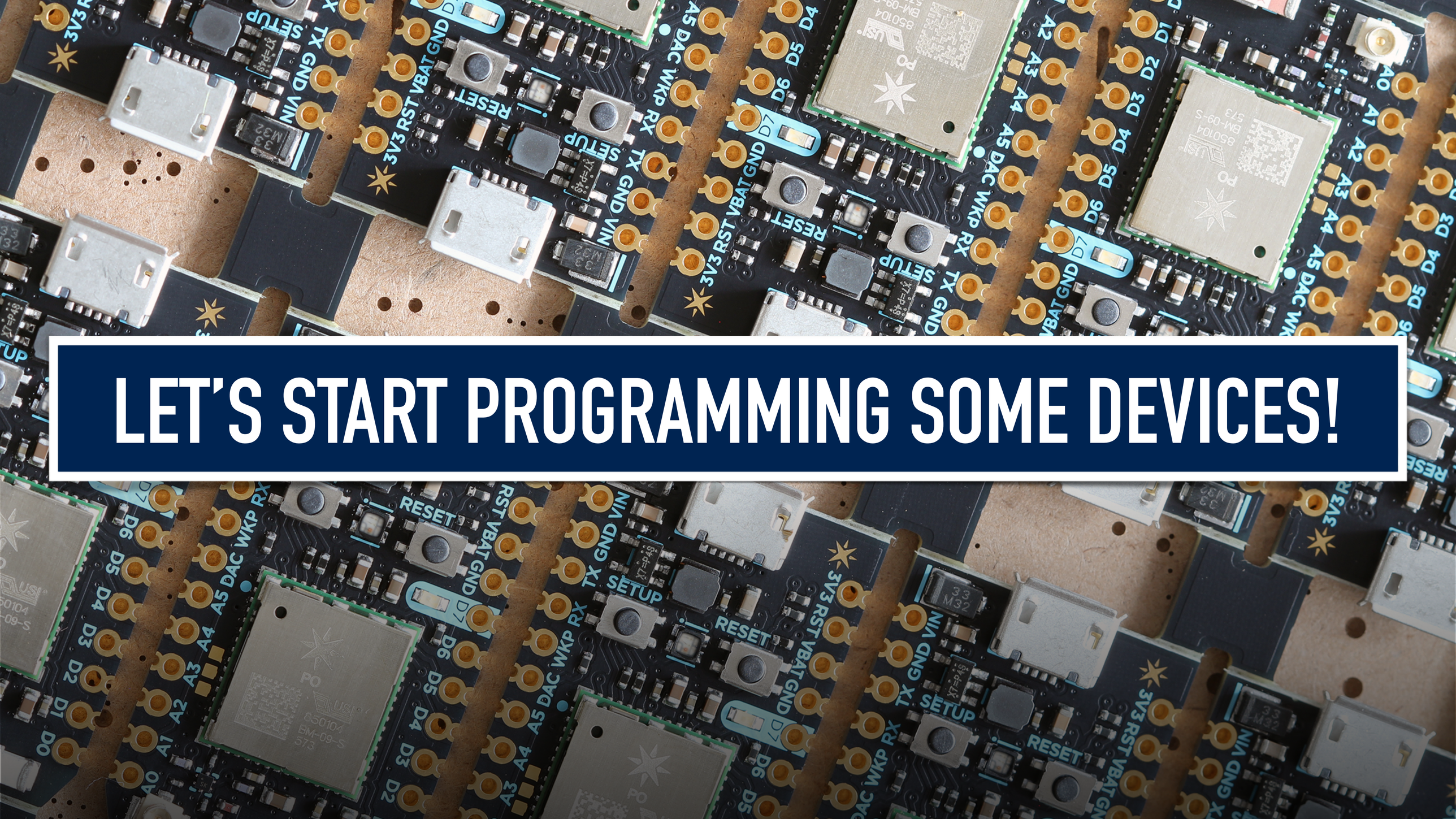
Device OS v0.8+ Required!

VIEWING CLOUD VARIABLES AND CALLING CLOUD FUNCTIONS






THE PARTICLE CONSOLE
DEMO


LET'S START PROGRAMMING SOME DEVICES!